VOLUME L
NUMBER THREE

THE NATIONAL GEOGRAPHIC MAGAZINE

SEPTEMBER, 1926

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TO carry out the purposes for which it was founded thirty-eight years ago, the National Geographic Society publishes this Magazine. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society is conducting extensive explorations and excavations in northwestern New Mexico, which was one of the most densely populated areas in North America before Columbus came, a region where prehistoric peoples lived in vast communal dwellings and whose customs, ceremonies, and name have been engulfed in an oblivion.

THE Society also is maintaining expeditions in the unknown area adjacent to the San Juan River in southeastern Utah, and in Yunnan, Kweichow, and Kansu, China—all regions virgin to scientific study.

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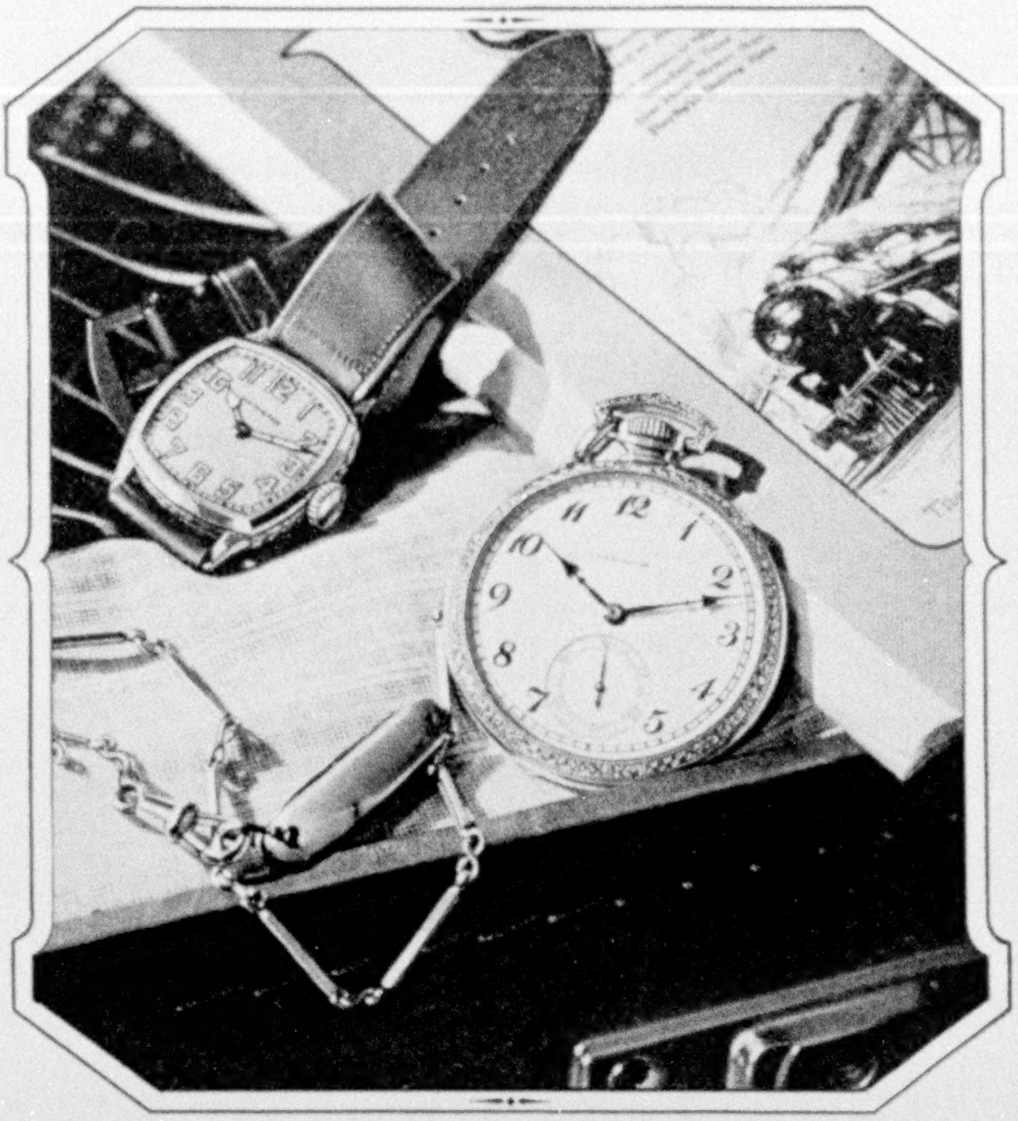

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The beautiful new pocket Hamilton shown in the illustration. Chased case of green or white filled Gold, 17-Jewel Adjusted Movement

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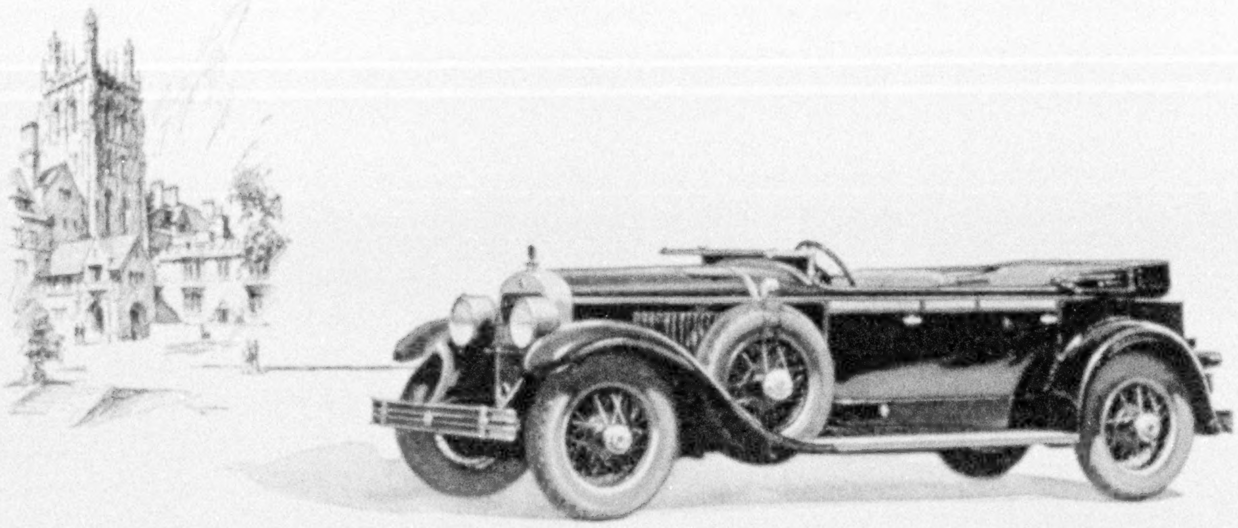

50 Body Styles and Types

500 Color Combinations

Standard — Fisher Custom Built — Fleetwood Custom Built

Cadillac's genius for leadership was never so manifest as today, when, following on the heels of the most successful year in its history, when sales increased 87.5 per cent, Cadillac inaugurates the unprecedented plan of providing 500 color and upholstery combinations, and 50 body styles and types.

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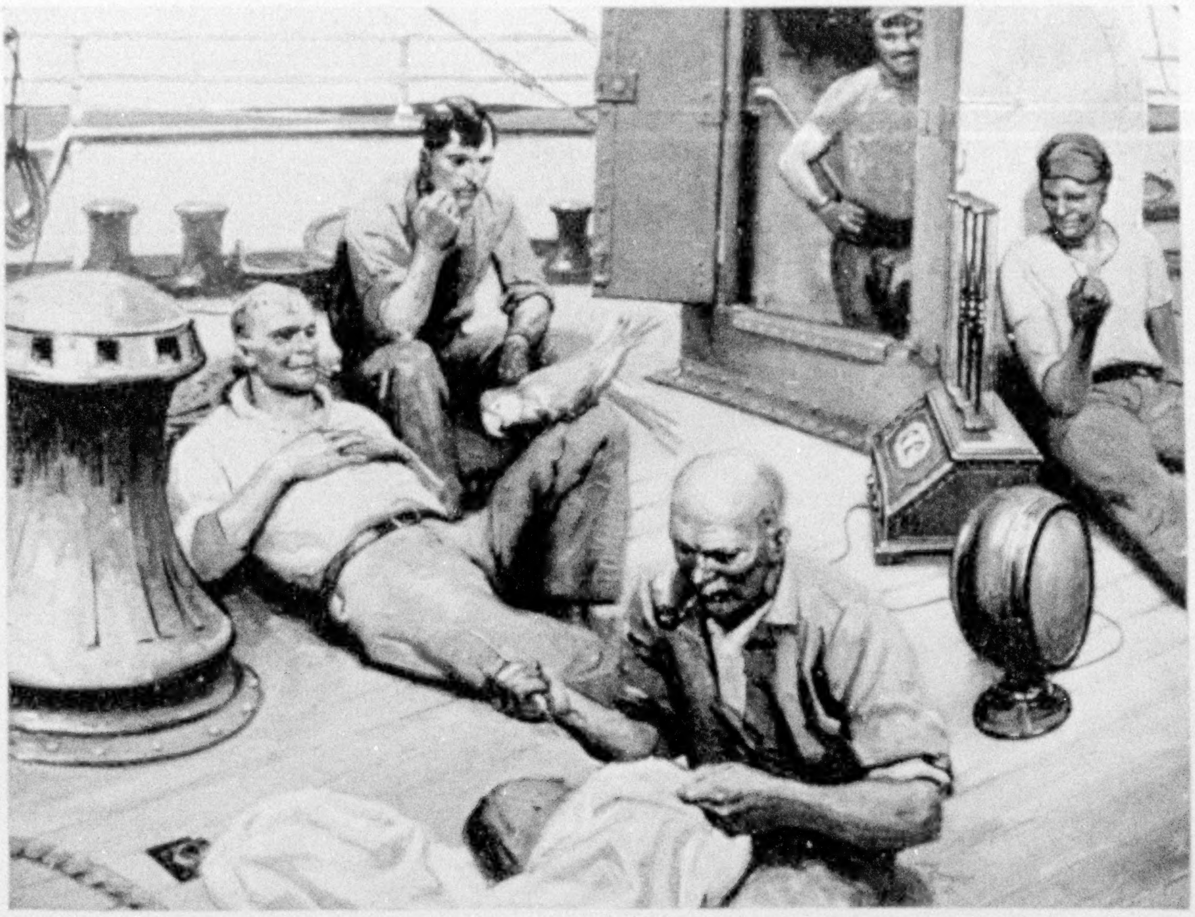

There is no loneliness where there is a Radiola.

A Radiola *super-heterodyne* does not grow old

DELICATELY precise—but sturdy! A Radiola super-heterodyne picks up a tiny fragment of the voice power sent out from a station hundreds of miles away—transforms it back again—unchanged and undistorted—into full song.

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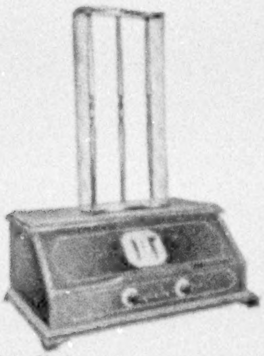

Radiola 25, super-heterodyne, with six Radiotrons $165

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height of its cosmopolitan
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It is the most complete and attractive World Cruise ever planned. It visits as many places as it is possible to include in a trip of reasonable length and see adequately. And they are all famous spots that you have longed to see—*Tokyo, Korea, Peking, Hong Kong, Manila, Sydney, Java, Ceylon, Bombay, Taj Mahal, Cairo, Athens, Naples, the Riviera*—to pick a few from the long list. It is the only cruise to visit *Australia, New Zealand* and *Tasmania*, in addition to *Japan, China & India*.

The Cruise-Ship is the "Carinthia"—the newest Cunarder—a liner of 20,000 tons that was designed especially for Cruising & is the best cruise ship in the world today. The rates are $2,250 and upward, according to accommodations selected.

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Send for the Booklet—"Round the World Cruise"

Another Remarkable Winter Cruise ∽ *Round South America*

Sailing from New York, January 29, 1927, and returning April 1

It covers the entire continent in the 2 months that are usually required to see a scant half ∽ It visits the great cities—*Rio de Janeiro, Buenos Aires, Montevideo & Santiago—the Straits of Magellan* and the towering *Andes*—picturesque old *Lima* in *Peru* and the *Indian Country* on the *West Coast.* Truly a wonderful opportunity really to see *South America* ∽ On the popular *Cunard* liner "*Laconia.*" Rates, $975 and upward ∽ Send for the illustrated Booklet—"*Round South America.*"

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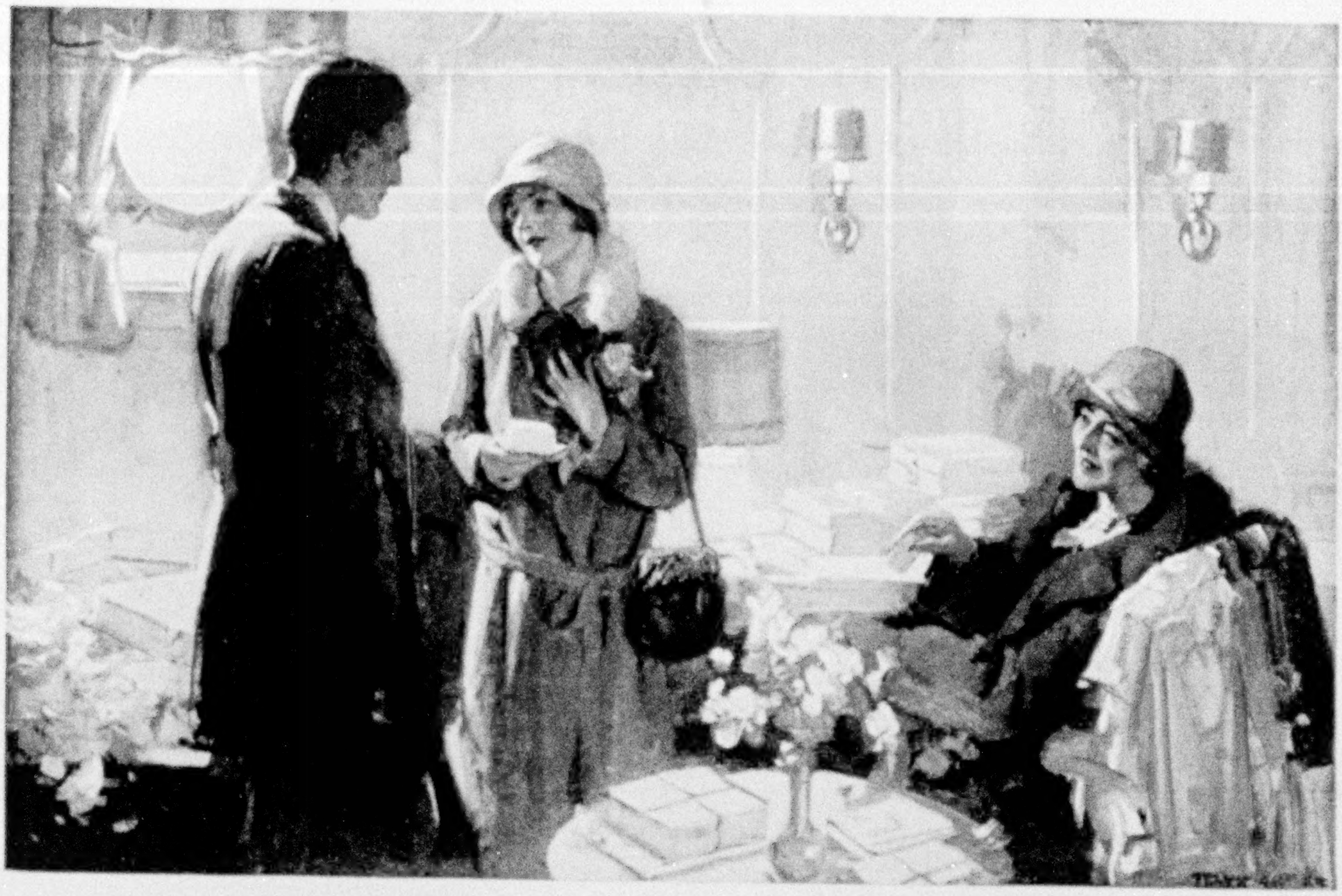

Give a gift that says "Bon Voyage" for all of Life's cruise

YES, it is easy to discharge a gift obligation lightly . . . and often quickly. But the fairest flowers wilt, and the best books are soon discarded, and the most tempting candies and fruits are all too quickly gone.

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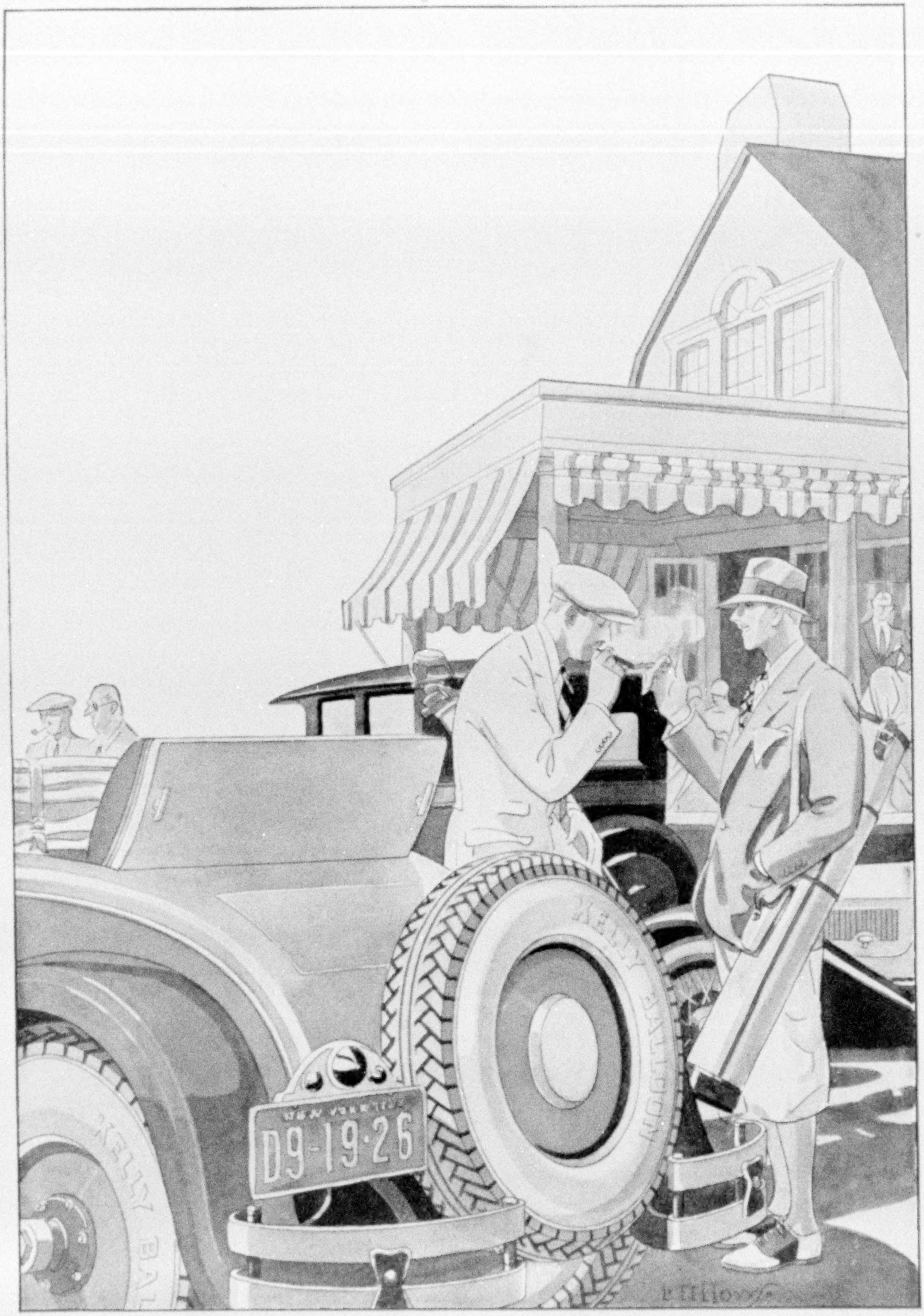
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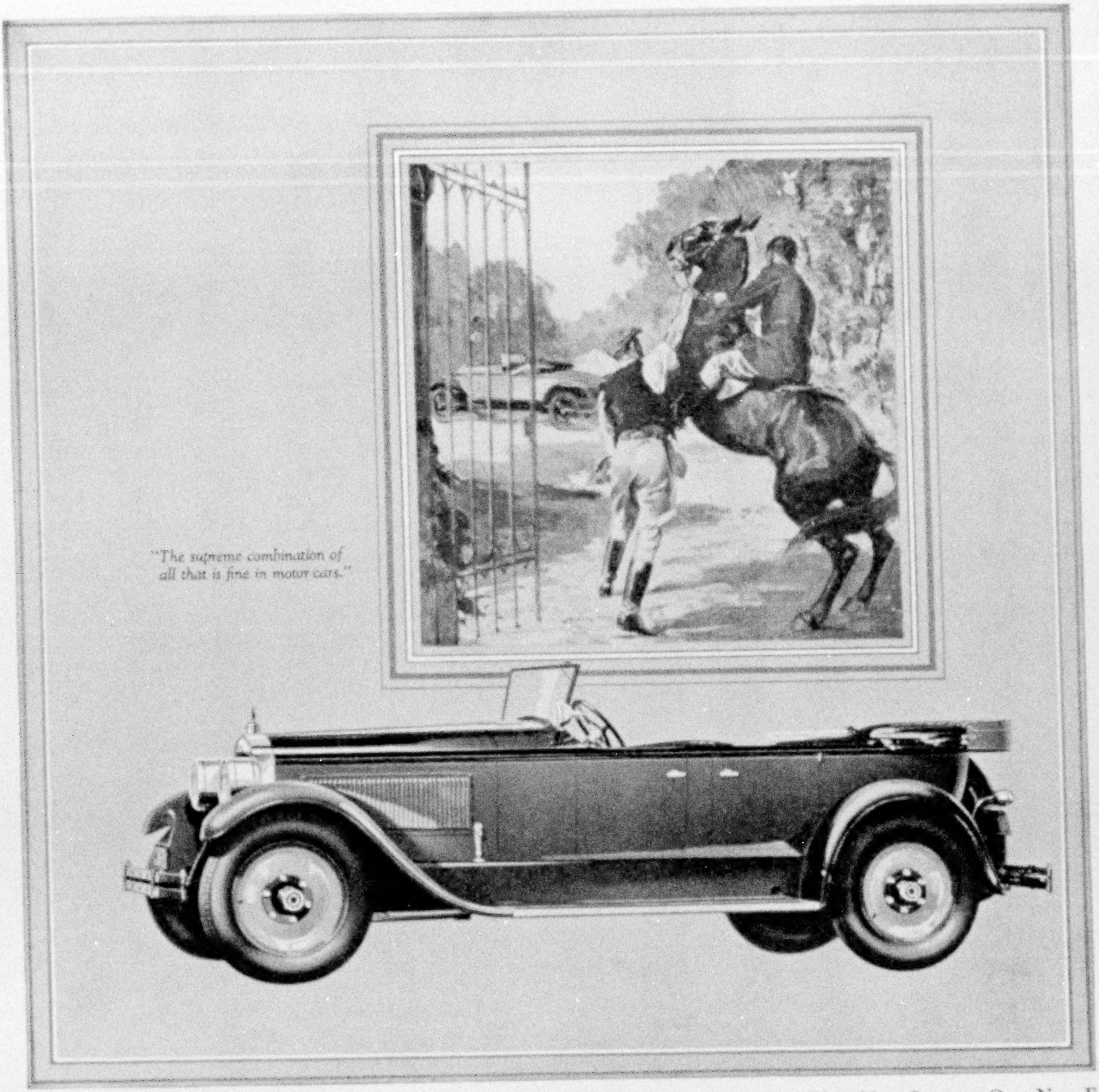


"The supreme combination of all that is fine in motor cars."

ASK THE MAN WHO OWNS ONE

Performance · Performance is usually the first quality considered by the buyer of any fine car.

Though comfort, beauty, distinction, and a host of other requirements must be satisfied—the motor car must first of all meet easily every demand of travel and traffic.

Packard performance is supreme. Closed car speed is the true criterion. Even the largest of the improved Packard Six and Packard Eight closed models, fully loaded, ask no odds of any car built—either in traffic or on the open road.

The top speed of Packard cars is too great for safe use anywhere off a speedway. But the power is there—reflected in a new standard of traffic agility and hill-climbing ability—the marvel of new owners.

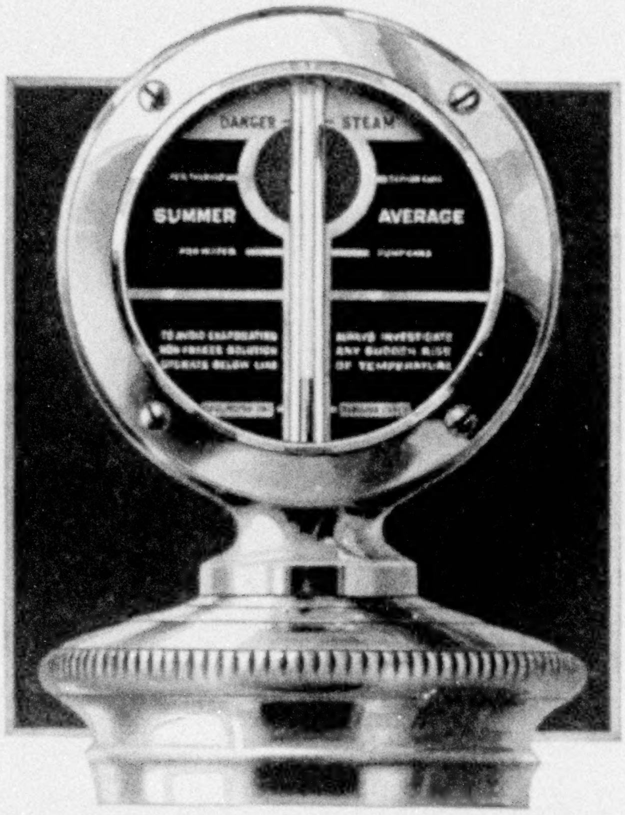
PACKARD

IT CANNOT FORGET

protects

8,000,000

motors



Universal Model—$7.50

MORE than human, The Boyce Moto Meter never forgets. Under every driving condition it is a tireless, dependable indicator of motor trouble.

⁂

The Boyce Moto Meter is as essential in fall and winter as during the warm months. Lack of water, a broken fan belt or a frozen radiator overheats your motor in cold weather as in warm and scored cylinders are just as expensive.

⁂

It enables you to regulate your radiator shutter to summer efficiency.

⁂

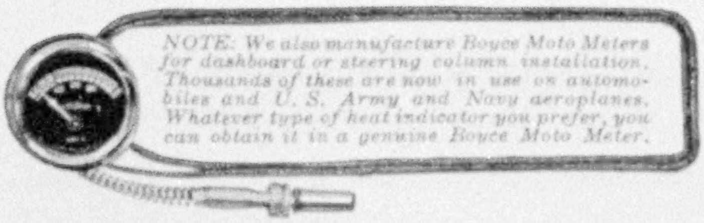
It stands today on the radiator caps of 8,000,000 cars, always *directly in the line of driving vision* where it must be seen if your eyes are on the road.

⁂

To protect the motor cars of the world, Boyce Moto Meters are made in five foreign factories in addition to the American plants.

⁂

Dealers everywhere will show you a range of models for every type of car—in various designs—$3.50 to $15.00.



NOTE: We also manufacture Boyce Moto Meters for dashboard or steering column installation. Thousands of these are now in use on automobiles and U. S. Army and Navy aeroplanes. Whatever type of heat indicator you prefer, you can obtain it in a genuine Boyce Moto Meter.

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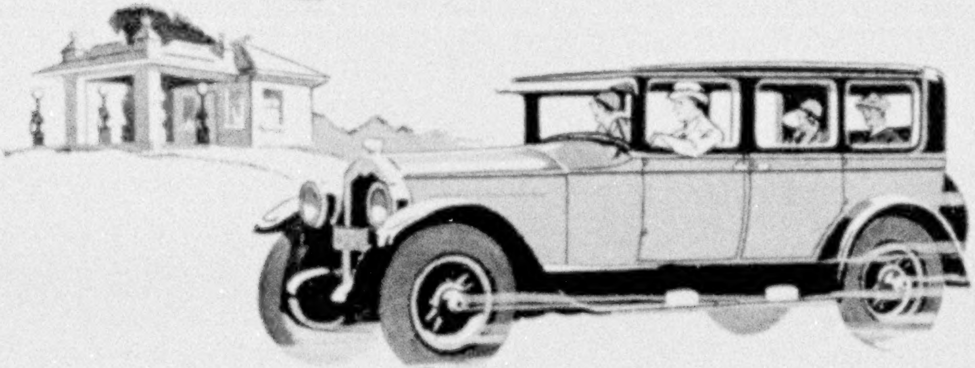
only 4 oil changes a year



The familiar warning, "Drain Crankcase Oil Every 500 Miles" does not apply to the 1927 Buick, because it has the Vacuum Ventilator.

This remarkable, new device protects the engine from diluted oil, and reduces to 4-a-year, the recommended number of oil changes.

There is *not a single moving part* in Buick's new guard for lubrication efficiency. Vacuum created by the air flow, does the work. It pulls all harmful vapors out of the crankcase as you drive.

With the 1927 Buick, all you need to do is add oil occasionally to keep the proper level. Then change it each Spring, Summer, Fall and Winter as a supercaution.

Never, in the 22 successful Buick years, has Buick produced a car so far ahead of its field in performance and value.

Convince yourself! Go to your Buick dealer and drive this great new car.

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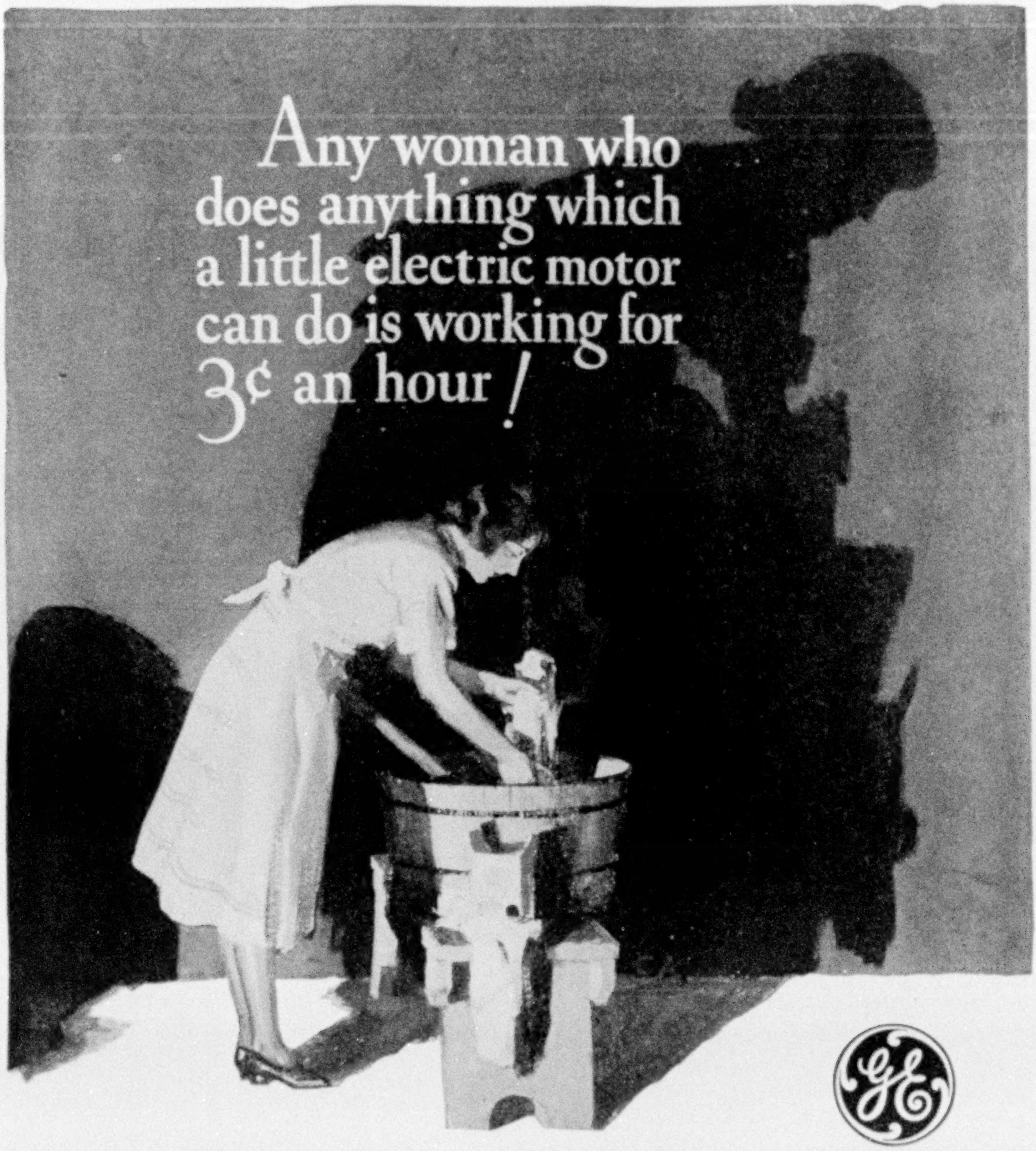

Any woman who does anything which a little electric motor can do is working for 3¢ an hour!

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Ask your electric company or dealer to help you select the labor-saving electrical appliances best suited for your home.

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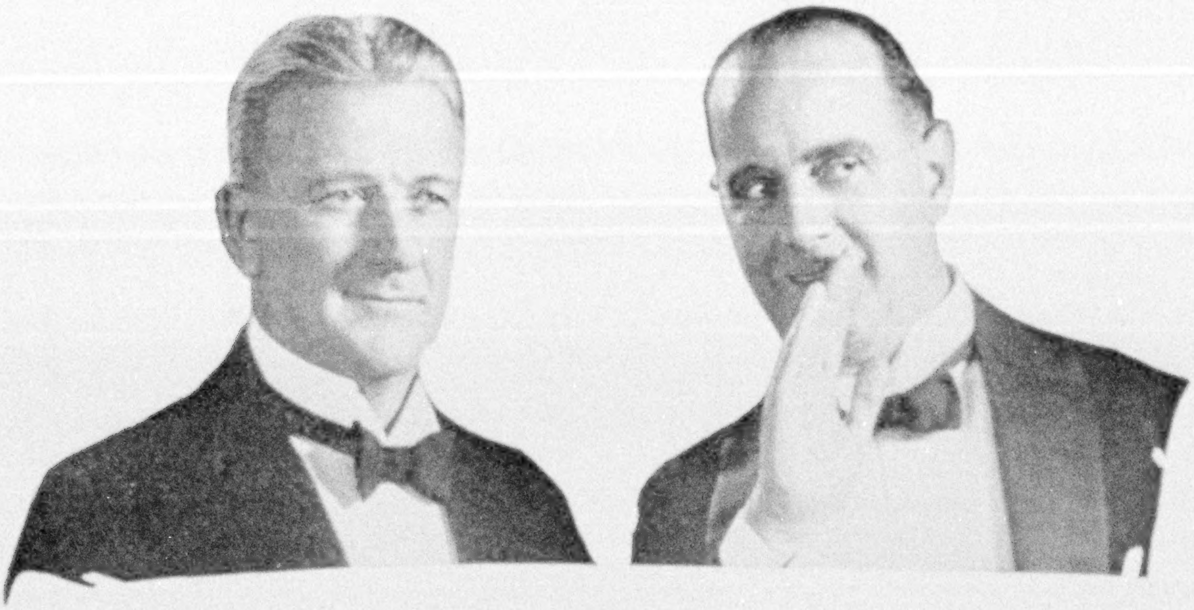

"That Man Corey is Certainly Interesting—"

They say that of him now wherever he goes—this Corey who never used to have a thing to say. Almost overnight he became one of the best-informed men of his group

"I NEVER knew that Corey was so well-educated."

"He isn't. He left school when he was a kid. Mighty interesting, though—isn't he?"

"Yes; he seems to know about everything. See how he's holding those people fascinated by what he's saying! He's quoting from Shelley, I believe."

"You ought to hear him at a business conference. He has all sorts of information at his command. I remember when he always used to be at a loss for something to say; now he can talk better than any of us."

"What amazes me is the way he can talk on almost any subject at all. And he seems to be familiar with all the great writers and philosophers. He must do a lot of reading."

"I don't see how he can. He's very busy, and I'm sure he hasn't any more time to read than we have. But I wonder how he became so well-informed — almost overnight, it seems to me. It has certainly made an interesting man of him."

Later they had occasion to speak to Corey; and they asked him about it. They weren't prepared for what he told them.

"Read?" he said. "Why, I scarcely ever get time to read at all."

"But in this one evening you quoted from Dante, from Browning, from Kipling, from Poe! How do you do it?"

Corey laughed. "Elbert Hubbard did all my reading for me—years ago. I simply use his Scrap Book."

"You use Hubbard's Scrap Book? What do you mean?"

"Well, you know that Elbert Hubbard began a scrap book when he was quite young. He put into it all the bits of writing that inspired him and helped him most. He searched the literature of every age and every country to find the ideas which would help him in his own work. As the scrap book grew, it became Hubbard's greatest source of ideas.

"After Hubbard's death the executors of his estate agreed to the publication of his scrap book. I have a copy. That's why I say Elbert Hubbard did my reading for me."

"So that's your secret! That's why you can talk so well on so many different subjects! That Elbert Hubbard Scrap Book has made you a different man, Corey!"

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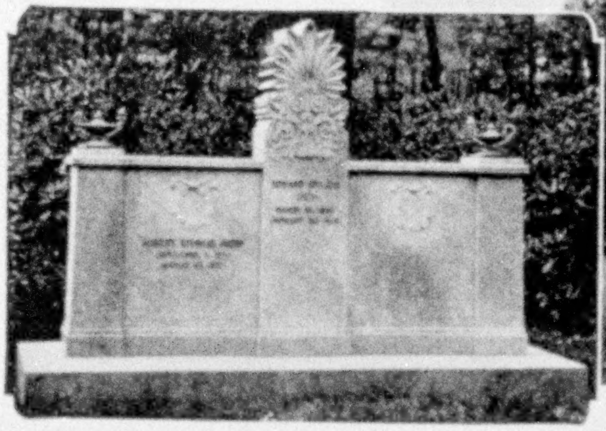

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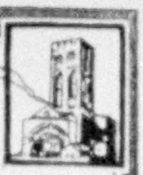

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utilizes newly discovered electrical processes to bring you music and radio of a beauty hitherto unknown

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The Brunswick Panatrope, Model 10. Finished in highly figured walnut. Price $650. (Slightly higher west of Rockies.)

GIORGIO POLACCO
Director Chicago Civic Opera Company, says:

"I am spellbound by this wonderful achievement of science, which, through electrical principles, has at last made it possible for music lovers to hear their favorite artists absolutely as perfectly as if they were in their presence."

THE PANATROPE is the joint achievement of four of the most widely-known institutions in the fields of electricity and acoustics: Radio Corporation of America, General Electric Company, Westinghouse Electric & Manufacturing Company, and The Brunswick-Balke-Collender Company.

Amazes critics

Although perfected less than a year ago, this new reproducing musical instrument has been heard by more than four million persons. When first demonstrated, it was given front-page space by the great metropolitan newspapers as the most important musical development of the age. Critics were no less enthusiastic. Nothing in the whole world of music ever created such profound interest and attention.

The Brunswick Panatrope may be had either alone or in combination with the Radiola Super-heterodyne. Thus it puts at your finger-tips all recorded music and the programs of radio as well. Operates entirely from the light socket; no batteries or outside wires needed.

Another triumph

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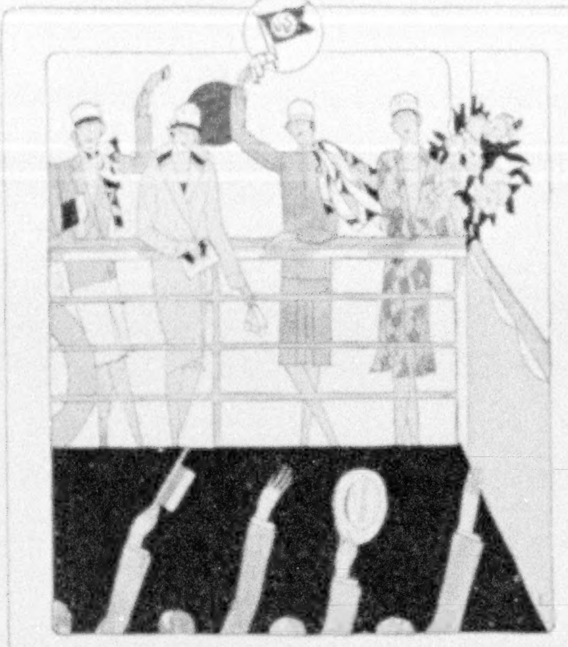

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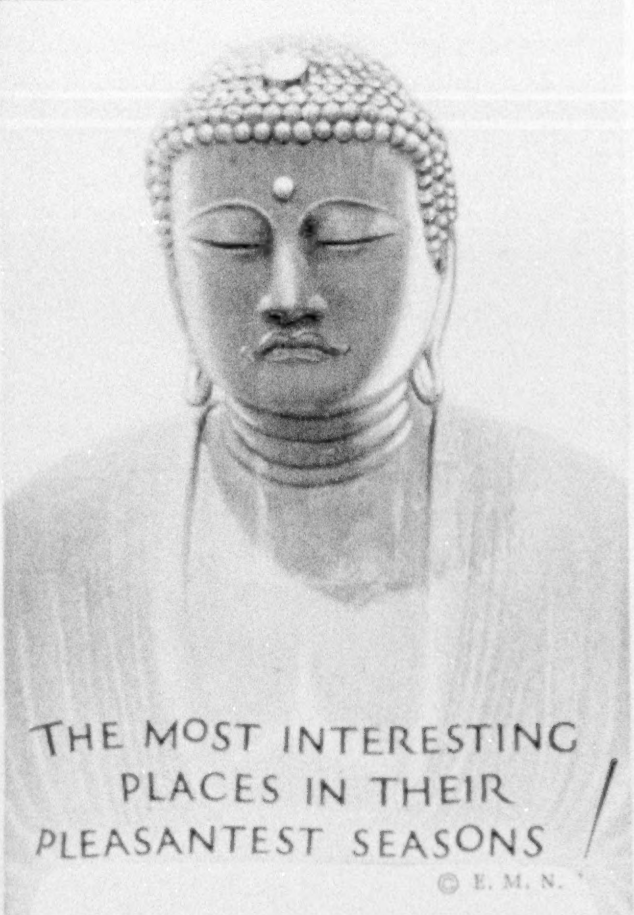

ON a 'round-the-world trip of the *Belgenland,* there were actually 129 sunny days out of 132! It seemed almost as though the weather had been specially ordered—the sun commandeered.

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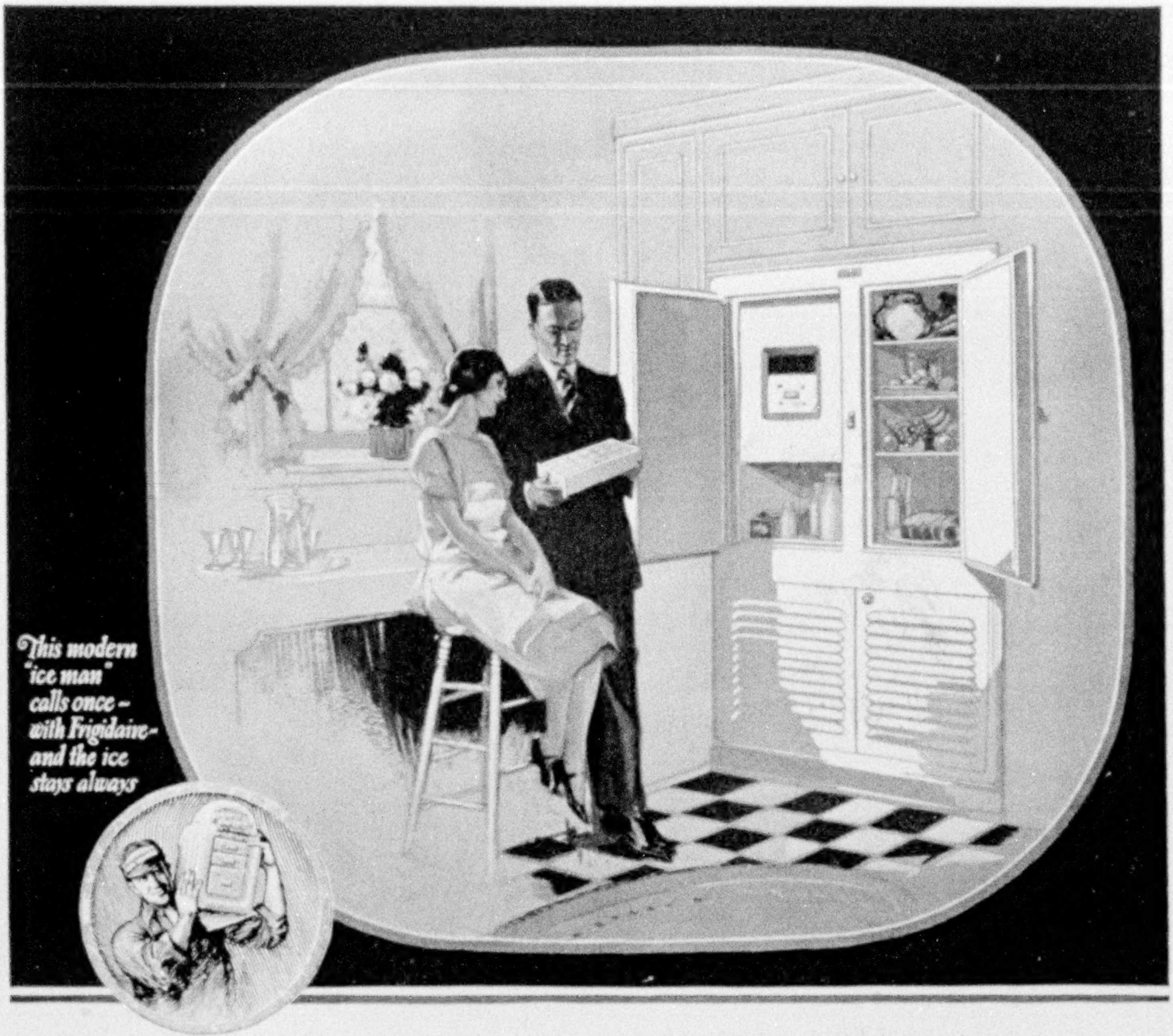
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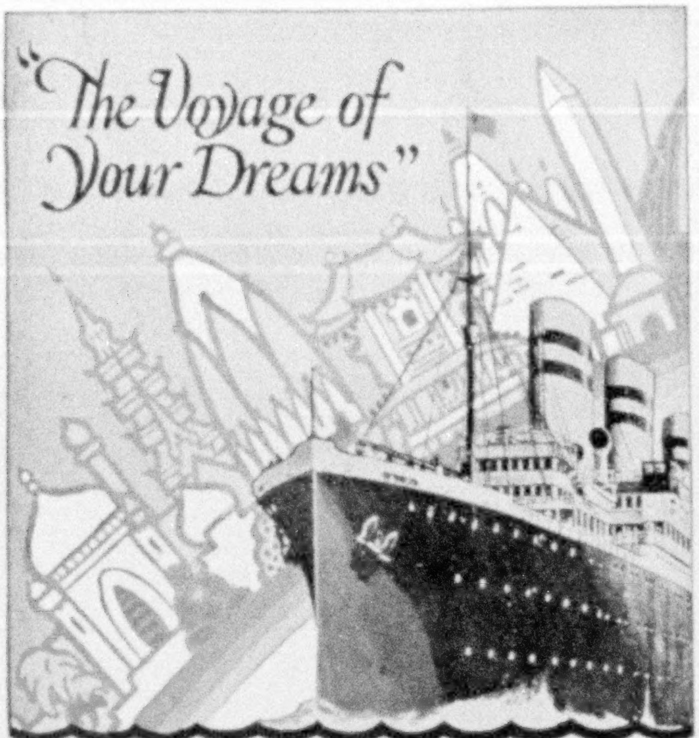
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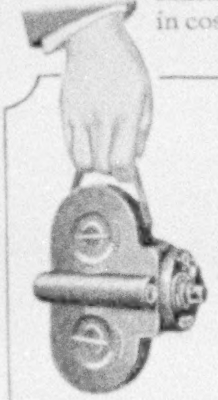

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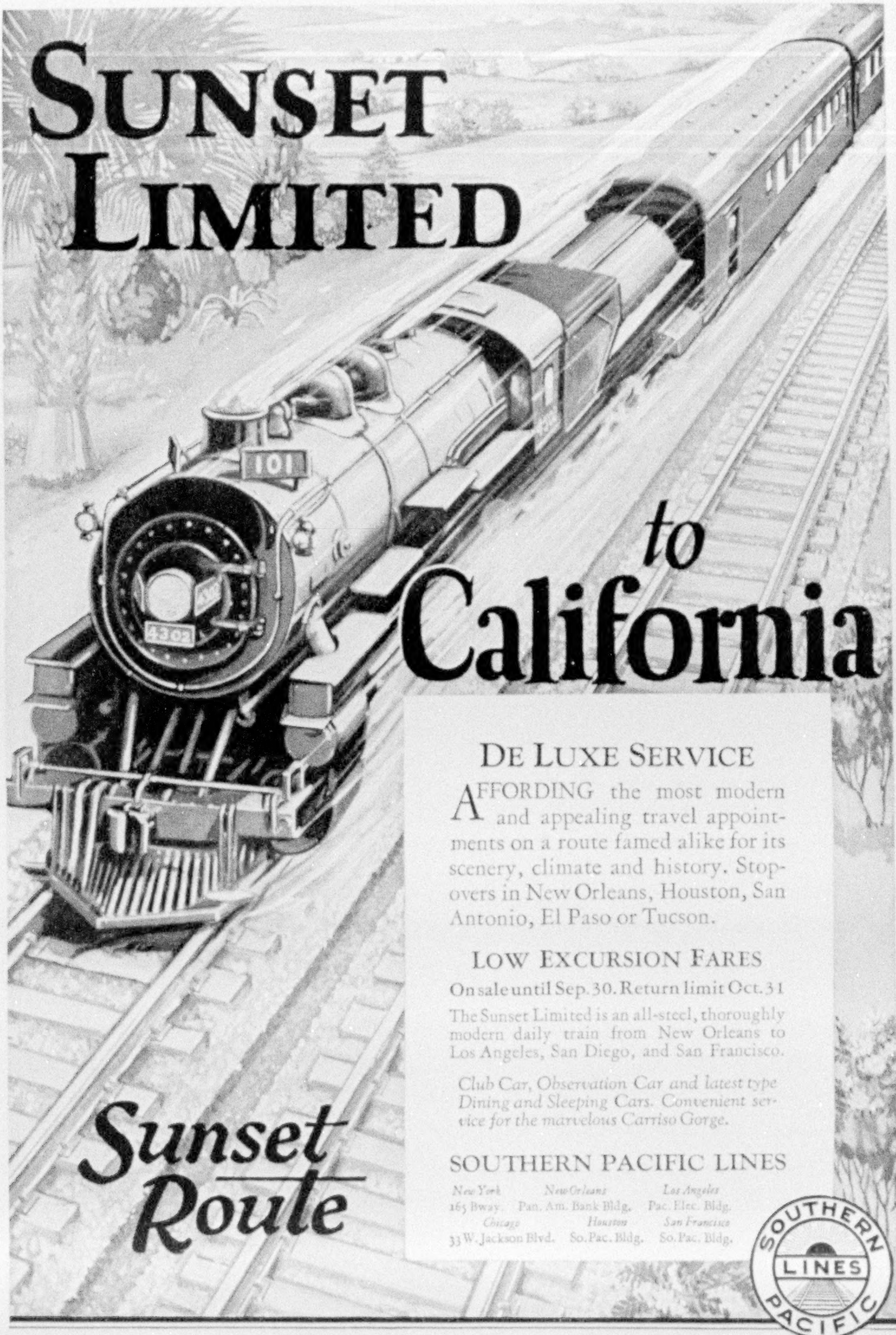

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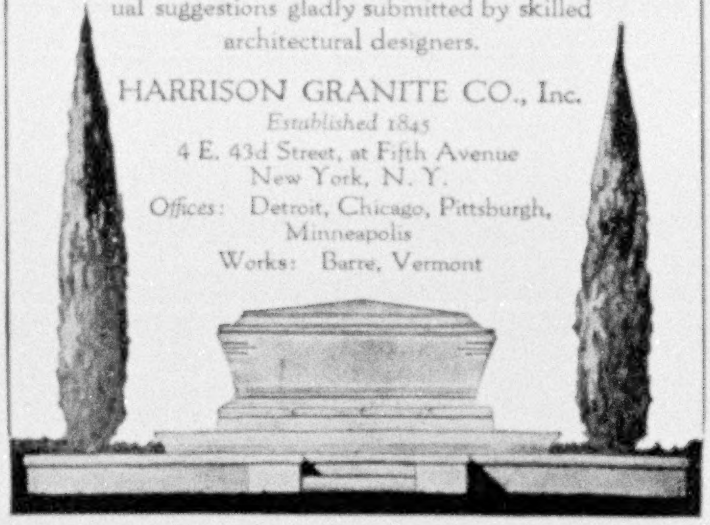

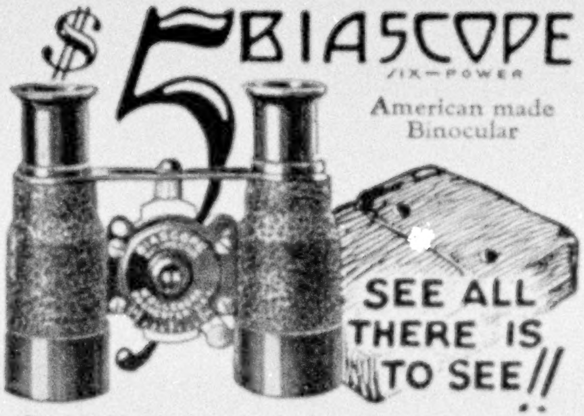

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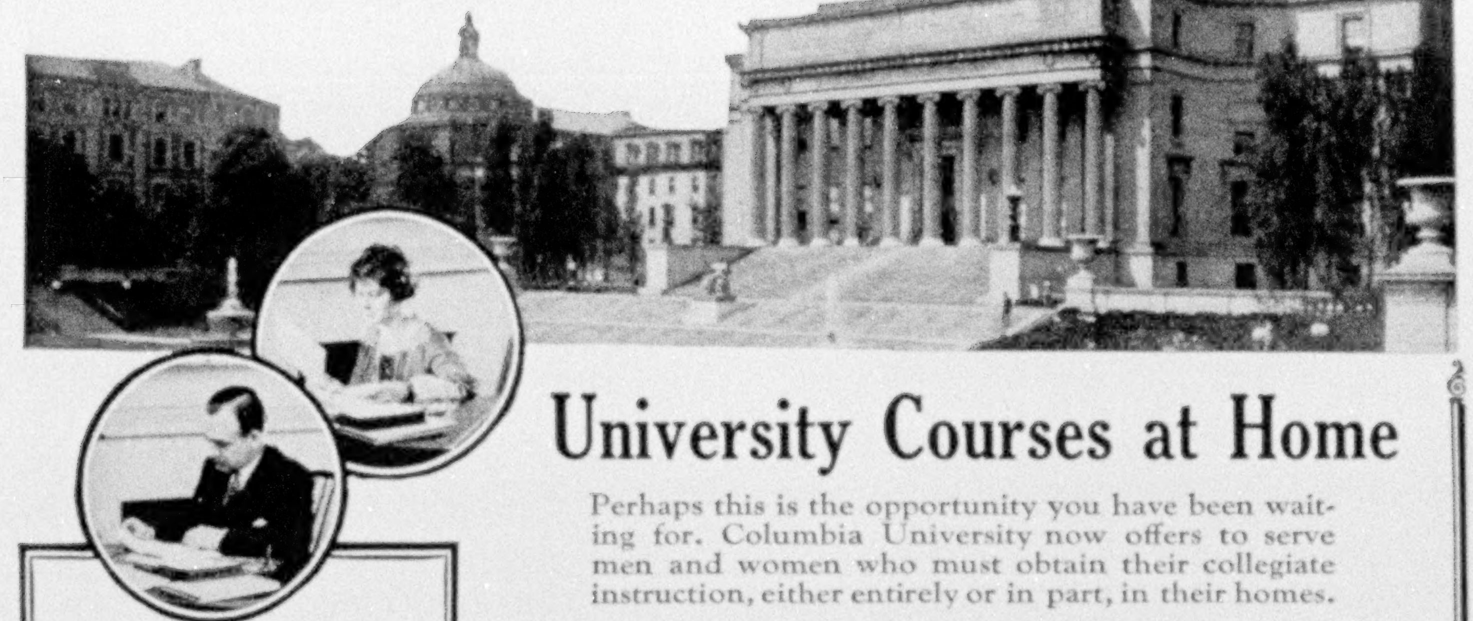

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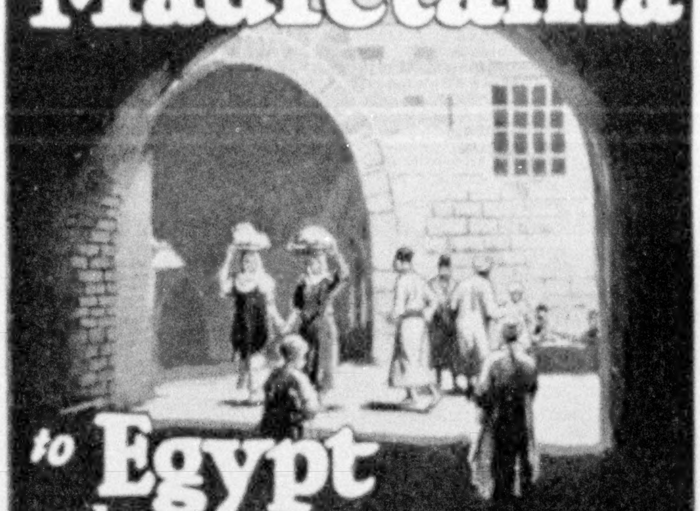

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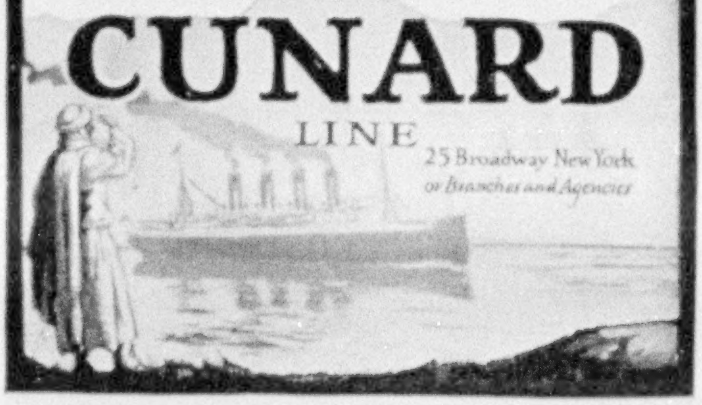

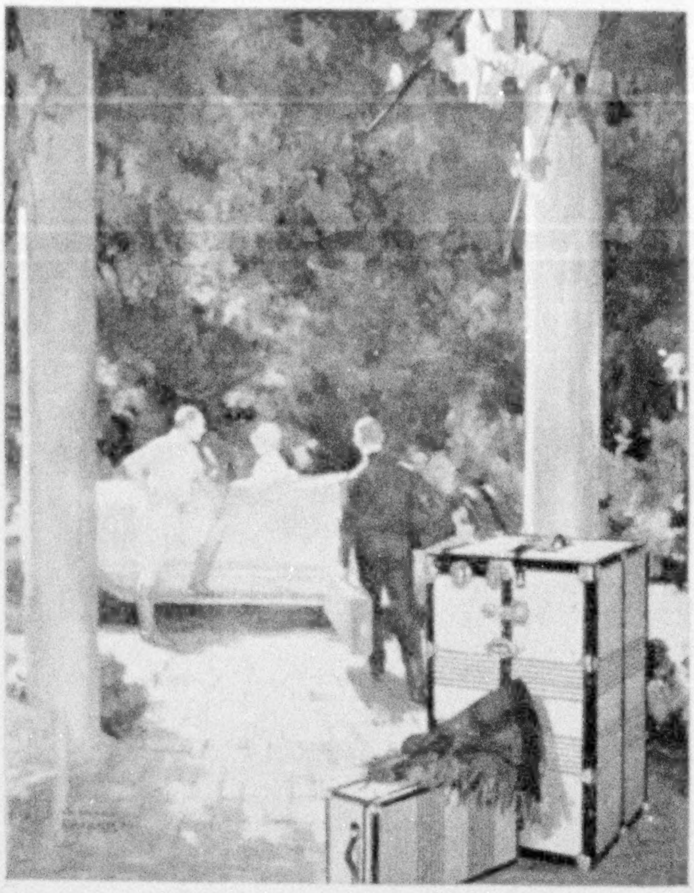

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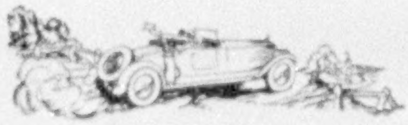

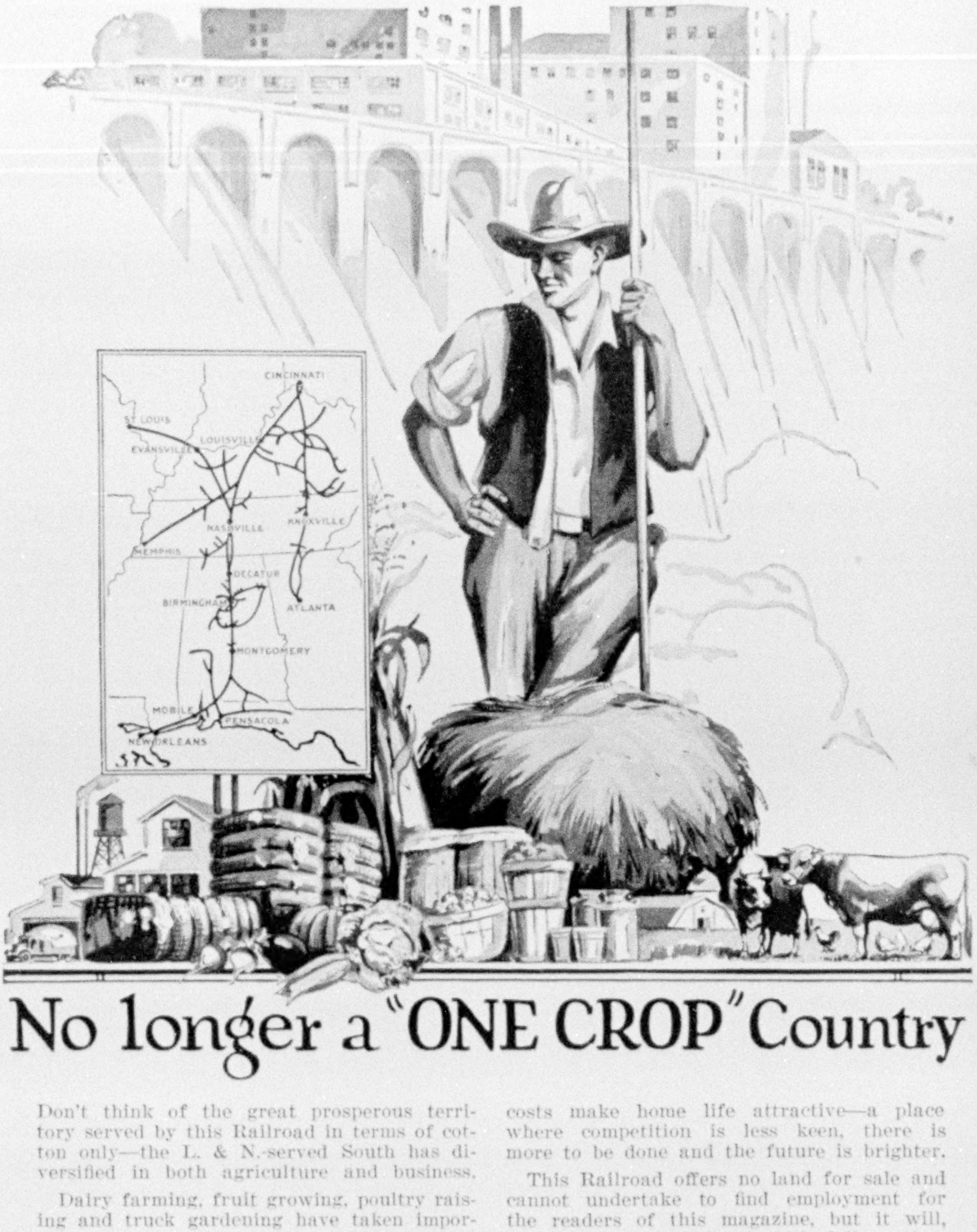
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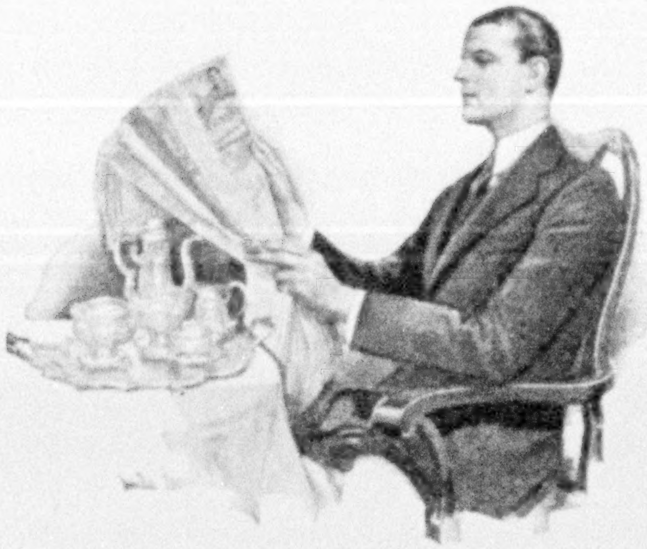

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10-day tubes of Palmolive Shaving Cream, free, to prove its case.

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You may think your present cream is supreme. But you can't be sure without trying this new creation.

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10 SHAVES FREE
and a can of Palmolive After Shaving Talc

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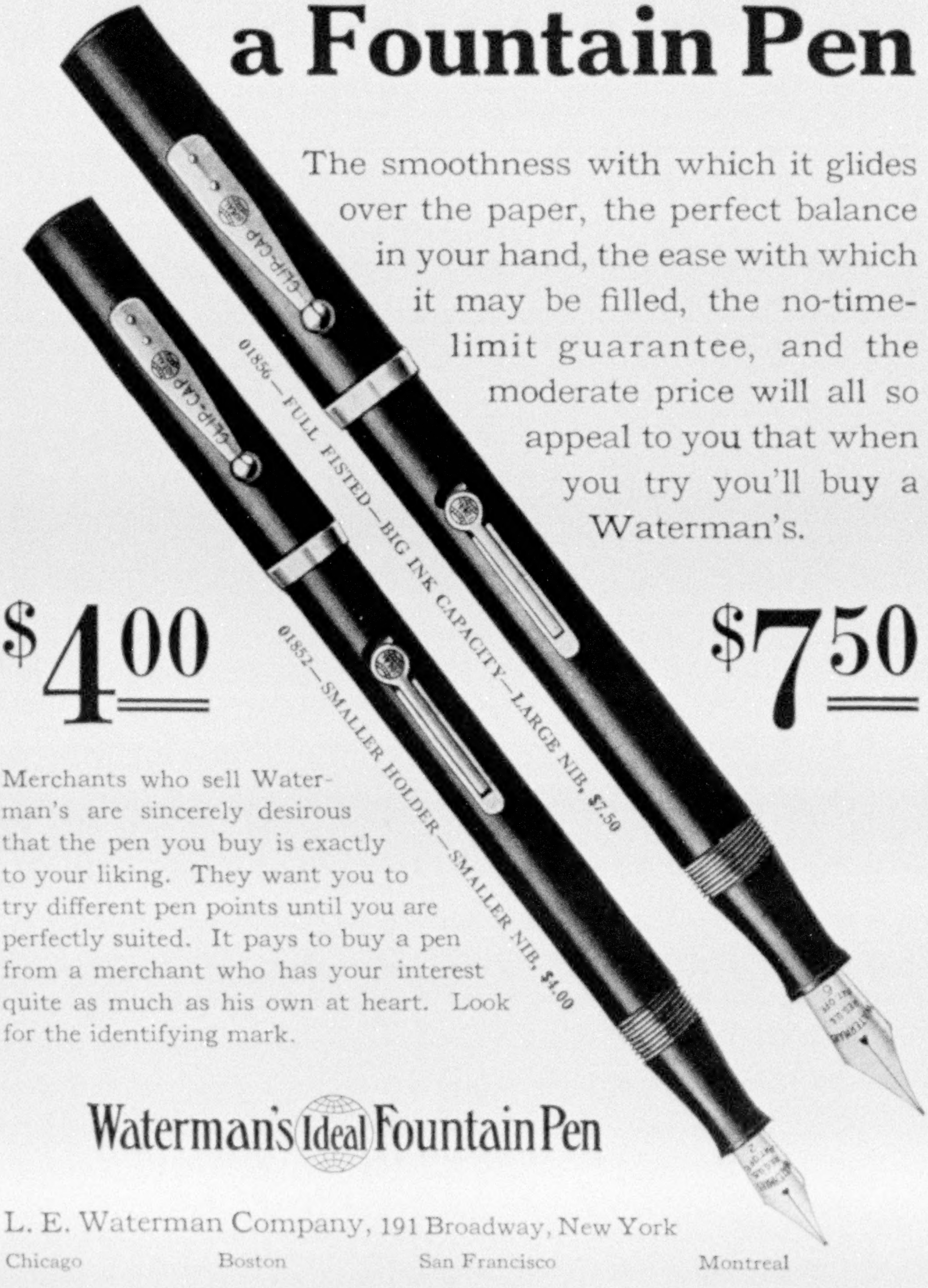
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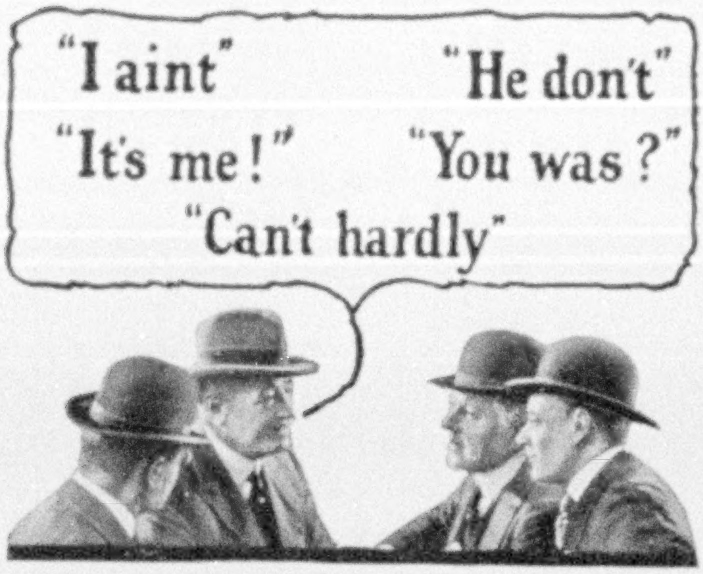

What Are YOUR Mistakes in English?

They may offend others as much as these offend you

IF some one you met for the first time made the mistakes in English shown above, what would you think of him? Would he inspire your respect? Would you be inclined to make a friend of him? Would you care to introduce him to others as a close friend of yours?

These errors are easy for you to see. Perhaps, however, you make other mistakes which offend other persons as much as these would offend you. How do you know that you do not mispronounce certain words? Are you always sure that the things you say and write are grammatically correct? To you they may seem correct, but others may know they are wrong.

Unfortunately, people will not correct you when you make mistakes; all they do is to make a mental reservation about you. "He is ignorant and uncultured," they think. So you really have no way of telling when your English offends others.

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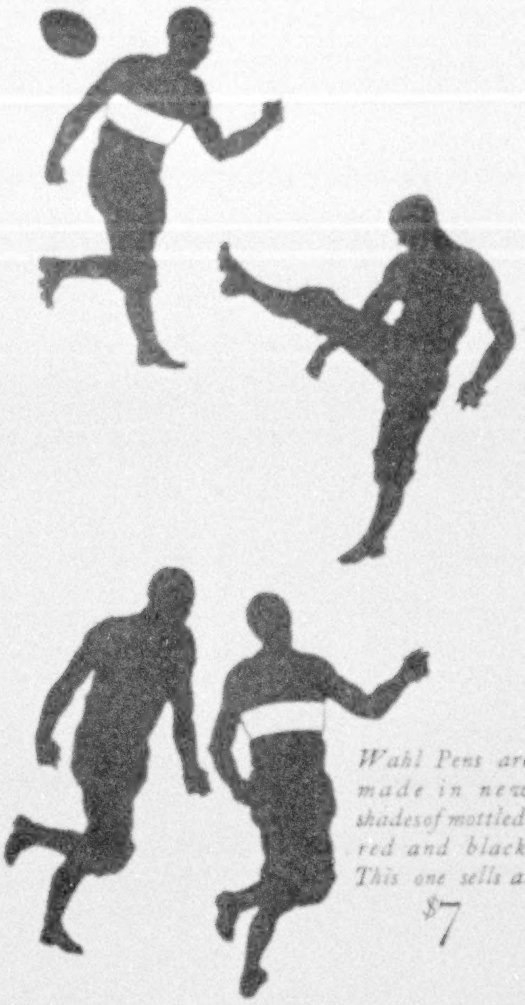

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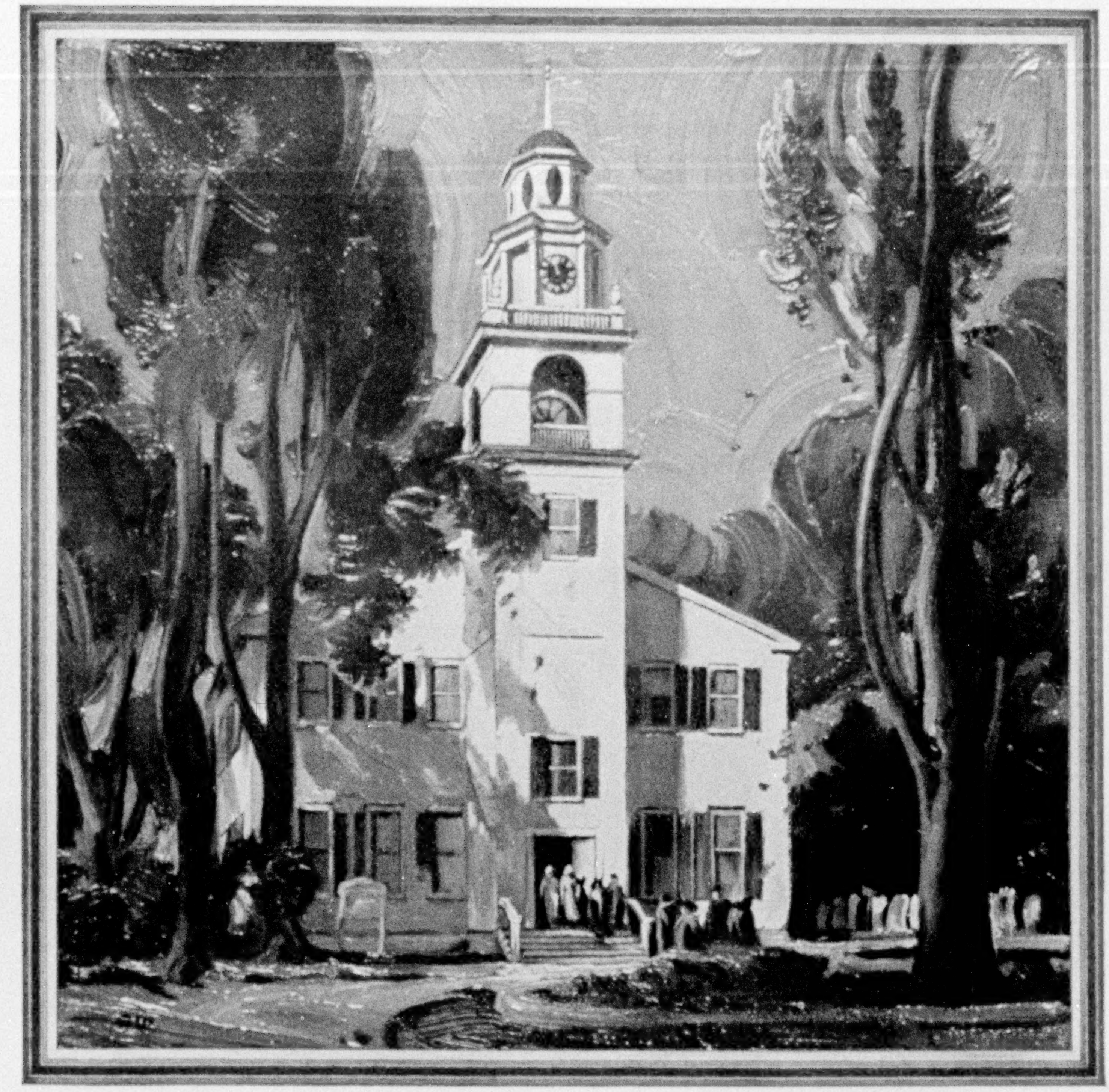

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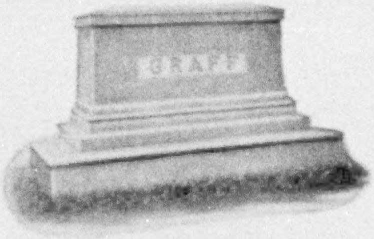

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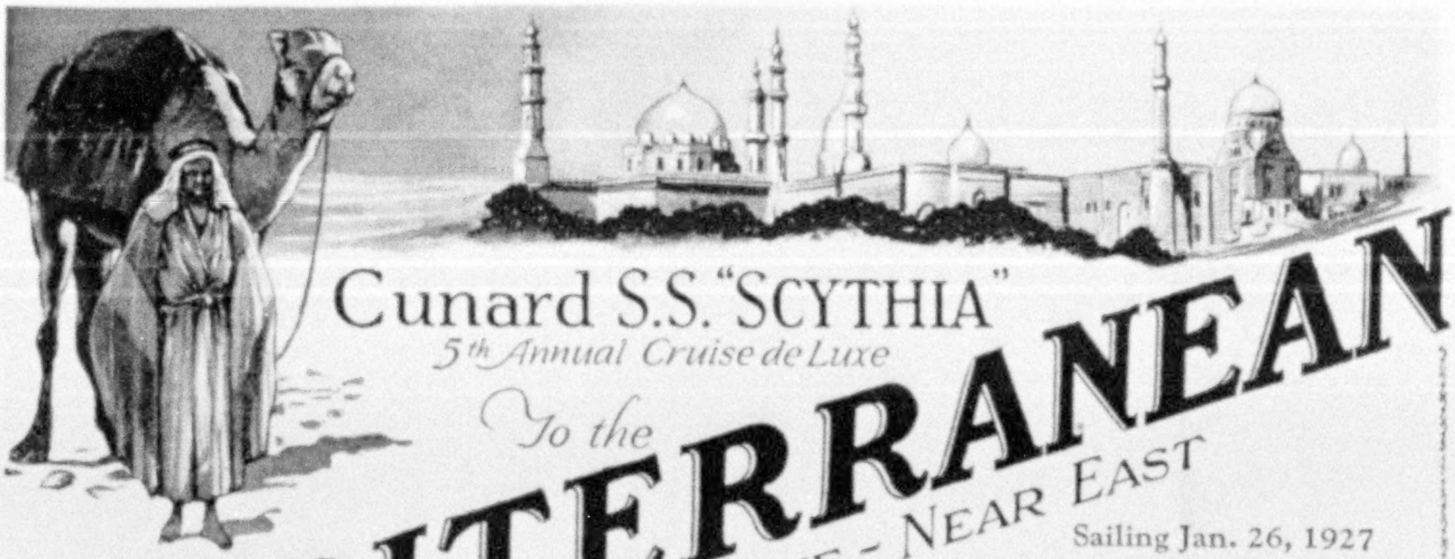

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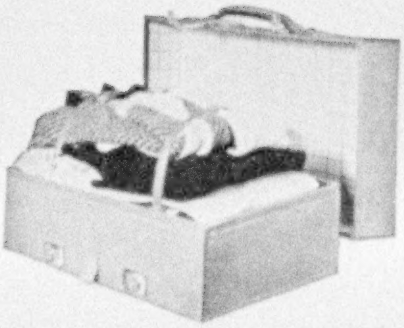

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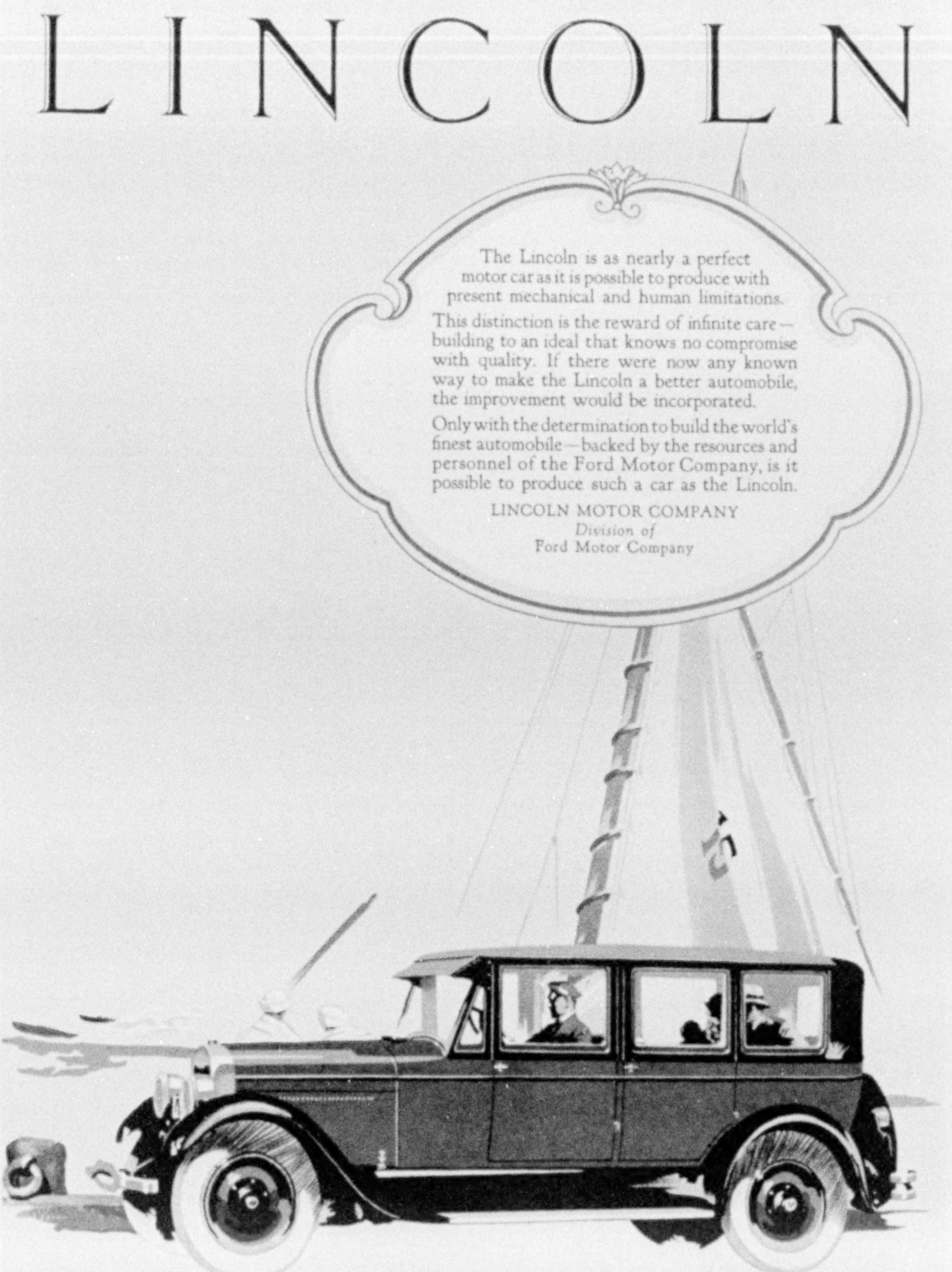

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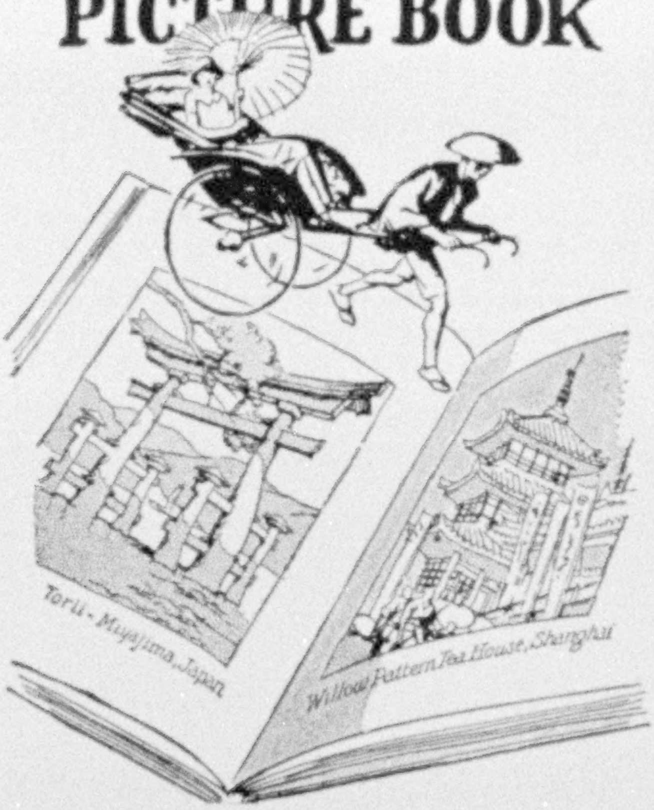
Torii - Miyajima, Japan
Willow Pattern Tea House, Shanghai

Go this year to the ORIENT

Ride into the picture book—and come out on the other side of the world . . . In the gorgeous East—with its red lacquer gates and golden roofs, little scented shops and twisty streets, temples full of incense, gongs and gods. Fill up your ricksha with tortoise shell and silk, painted fans and hand-wrought silver; with gold and red lacquer, a Canton shawl and embroideries you couldn't do in half a lifetime . . . . .

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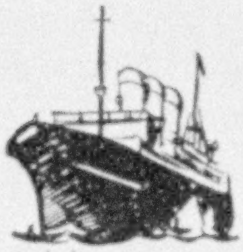

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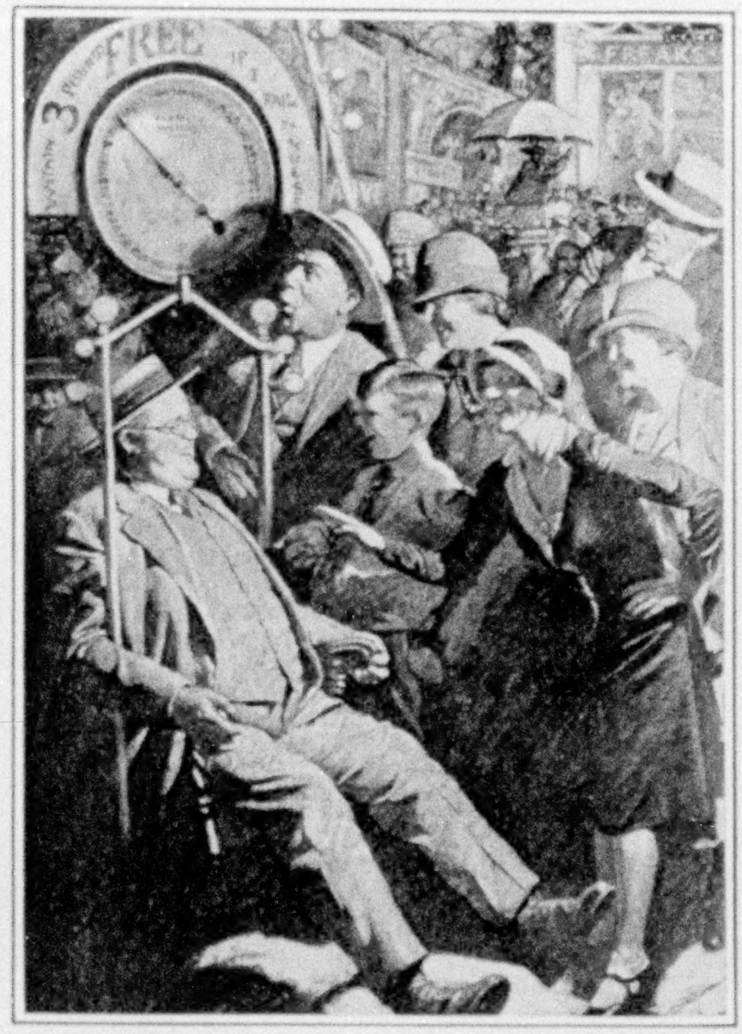

"STEP right up! Let me guess your weight!" the barker shouts and up steps the laughing, jostling crowd eager for fun. And it seems funny—but in reality the scales are engaged in a serious business. They say to the fat, "Beware—you are in danger!" And to the thin, "Take heed—trouble ahead!"

IT is estimated that one-eighth of the people of the United States are overweight to such an extent that their health is menaced. On the other hand, in their efforts to be slim, thousands of girls and young women are definitely undermining their health.

Up to the age of 30 it is well to weigh five or ten pounds more than the average for your age and height. Extra weight in youth is needed to fortify the body against tuberculosis and other infections to which young persons are particularly subject.

But from 30 on, it is best to weigh less than the average, particularly as age advances. Excess weight over 30 may be a predisposing cause of heart disease, diabetes, gout, kidney trouble, high blood pressure, hardening of the arteries and apoplexy. Reduce safely—do not take dangerous "fat reducers". Get the advice of your physician.

Begin now to work toward your proper weight—and when you reach it, keep it.

Persons past their youth who weigh 20% more than the average have a one-third greater death rate than the average. Those who are 40% overweight have a 50% greater death rate than the average.

The Metropolitan Life Insurance Company recognizes overweight as so serious an impairment among its policyholders that it has issued a booklet which contains much valuable information for those who wish to avoid dangerous overweight.

This booklet tells how a certain group of our own Metropolitan employees were brought back to normal weight by simple diet and exercise. In several cases as much as 50 pounds were eliminated—safely and comfortably.

In this booklet will be found a weight table prepared according to the latest study on the subject, as well as a complete program of diet and exercises that will help you to reduce your weight if you are organically sound.

A copy of "Overweight—Its Cause and Treatment" will be mailed free to anyone who asks for it.

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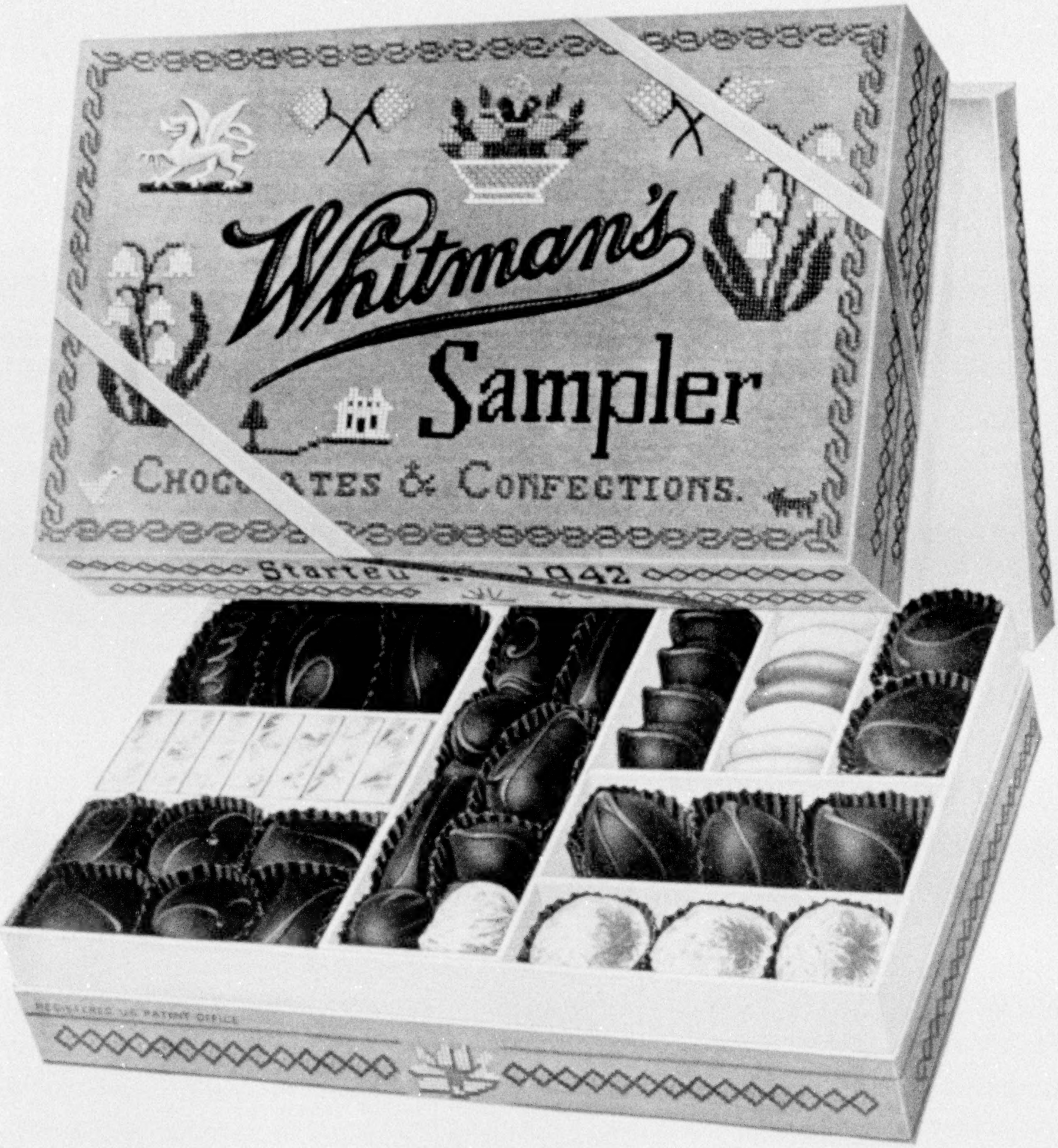
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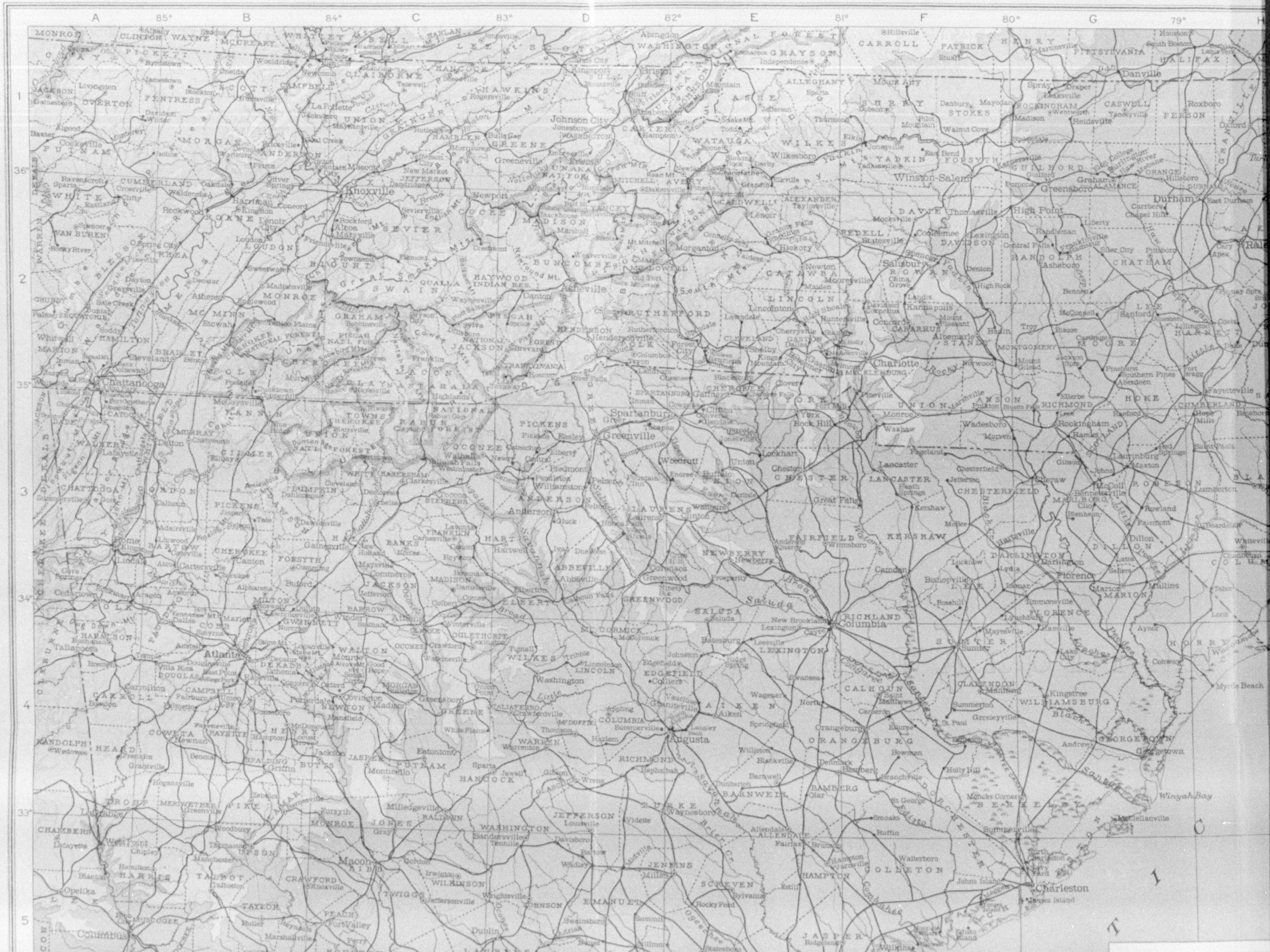
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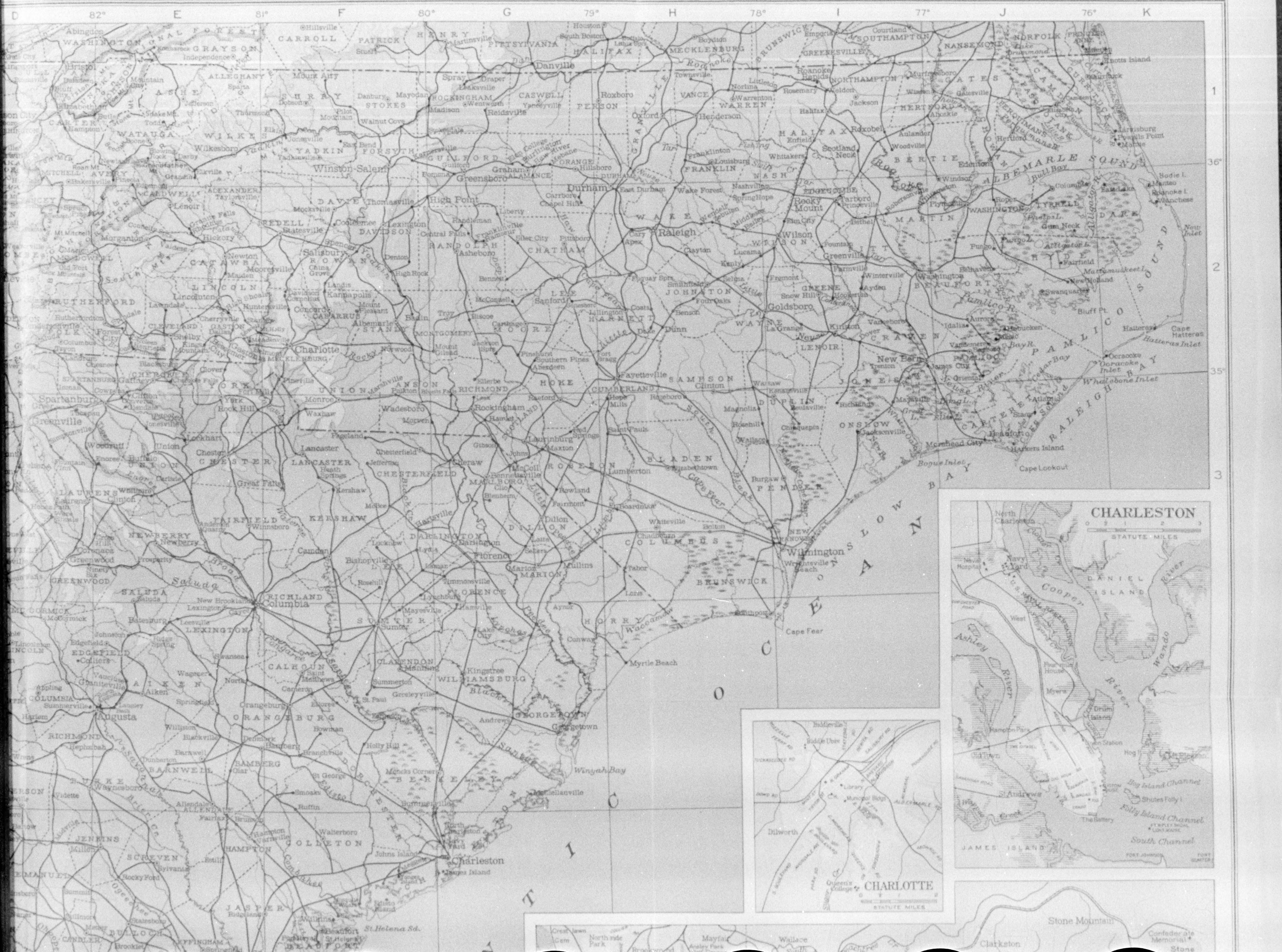
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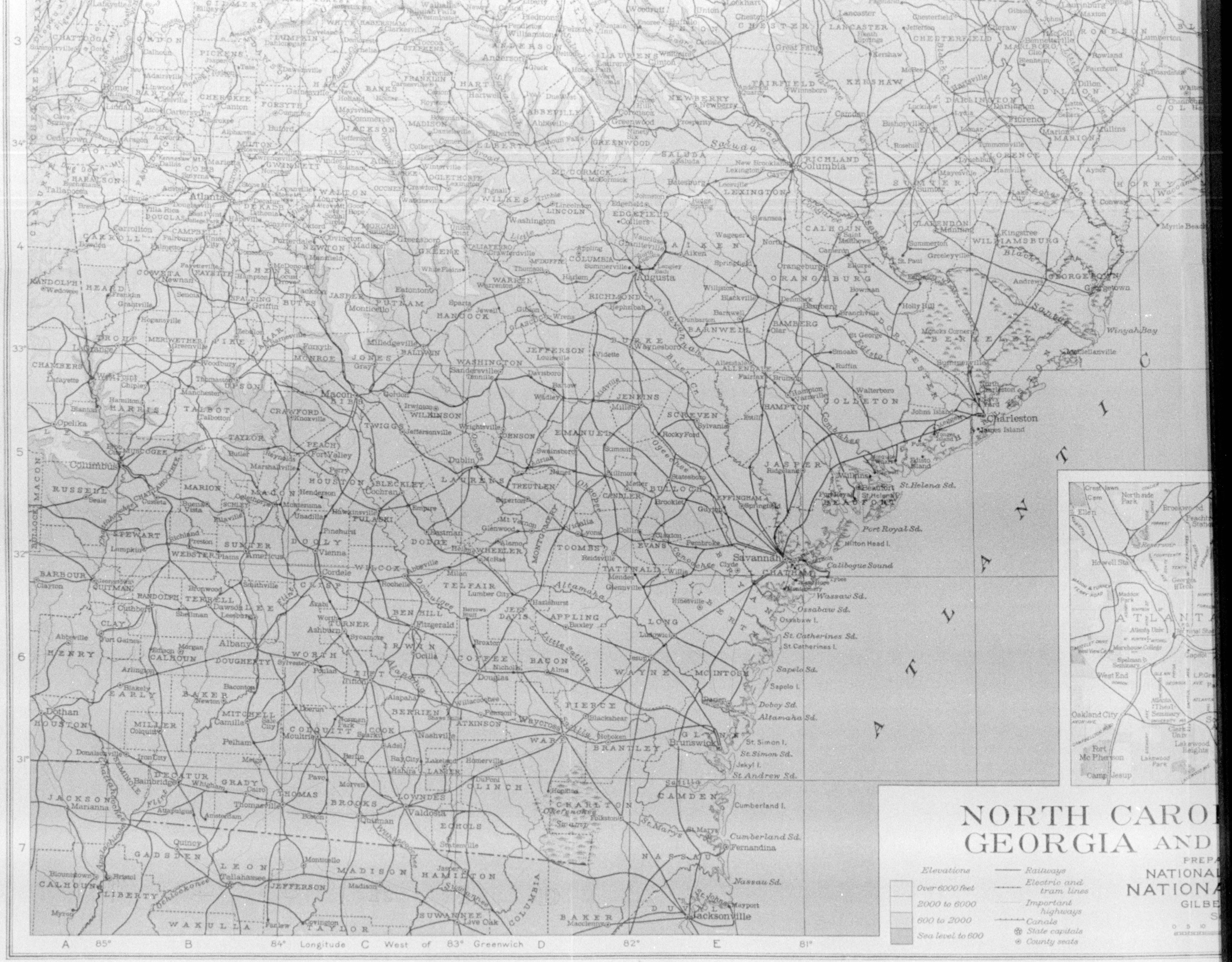
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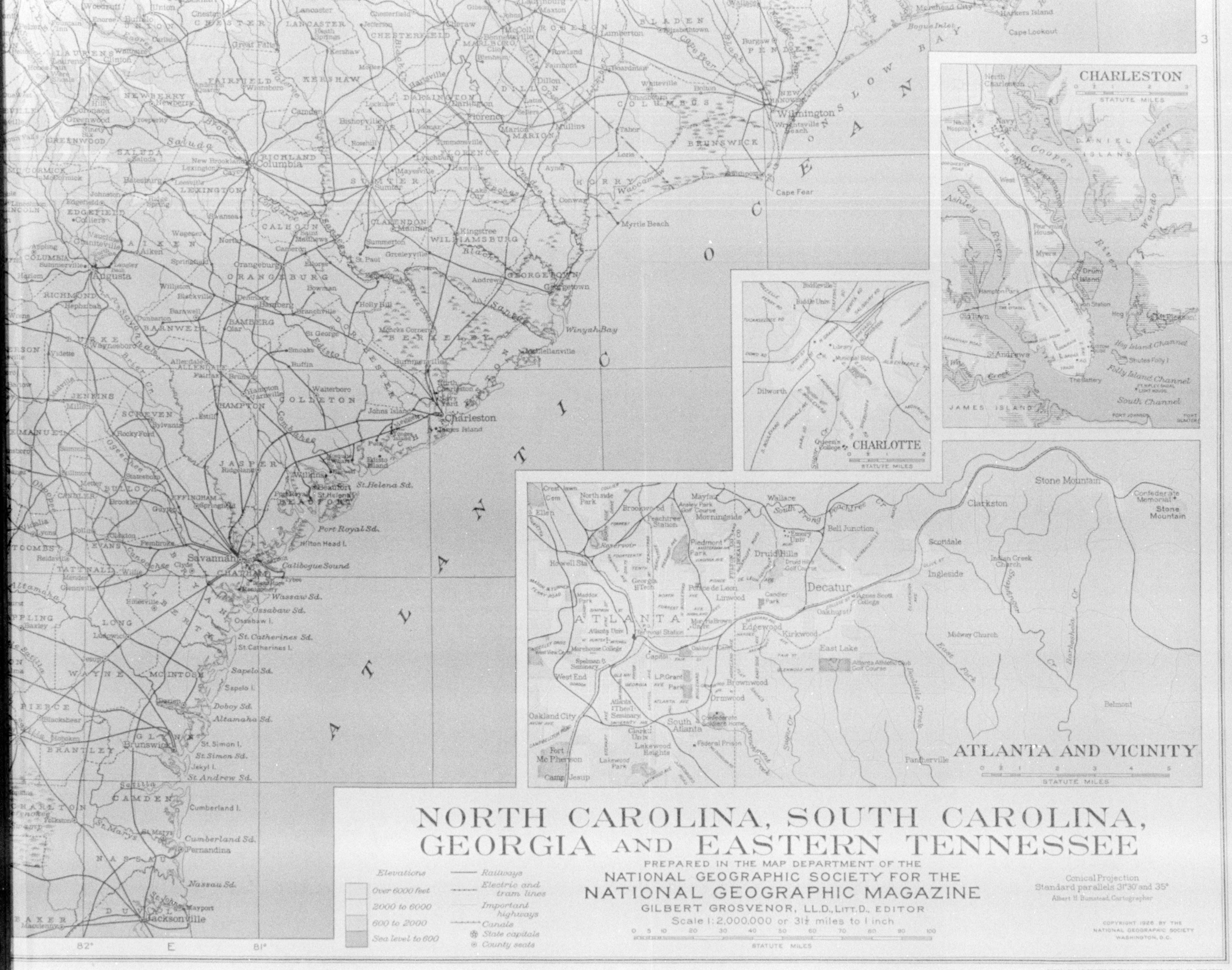
ATLANTIC
ATLANTA


CHARLESTON
STATUTE MILES
CHARLOTTE
STATUTE MILES
ATLANTA AND VICINITY
STATUTE MILES
ONSLOW BAY
ATLANTIC OCEAN
Elevations
Over 6000 feet
2000 to 6000
600 to 2000
Sea level to 600
Railways
Electric and tram lines
Important highways
Canals
State capitals
County seats
0 5 10 20 30 40 50 60 70 80 90 100
STATUTE MILES
82°
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3

NORTH CAROLINA, SOUTH CAROLINA, GEORGIA AND EASTERN TENNESSEE

PREPARED IN THE MAP DEPARTMENT OF THE
NATIONAL GEOGRAPHIC SOCIETY FOR THE
NATIONAL GEOGRAPHIC MAGAZINE
GILBERT GROSVENOR, LL.D., LITT.D., EDITOR
Scale 1:2,000,000 or 31½ miles to 1 inch

Conical Projection
Standard parallels 31°30' and 35°
Albert H. Bumstead, Cartographer

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MARCHING THROUGH GEORGIA SIXTY YEARS AFTER

Multifold Industries and Diversified Agriculture Are Restoring the Prosperity of America's Largest State East of the Mississippi

By Ralph A. Graves

Author of "A Short Visit to Wales," "The Millennial City," "Ships for the Seven Seas," etc., in the National Geographic Magazine

With Illustrations from Photographs by Clifton Adams, Staff Photographer

ONCE the Empire State of the South in wealth and culture as well as in the number of her square miles, Georgia awoke a few years ago to discover her prestige departing.

Her pine forests were rapidly vanishing; failure to rotate her crops had caused much of her rich tobacco lands to "burn out"; the devastating and irresistible boll-weevil army, marching eastward from Texas, threatened an even greater financial debacle than the army which marched from Lookout Mountain to the sea in 1864; a neighboring State had come suddenly to the fore in education, in improved highways, and in industrial development.

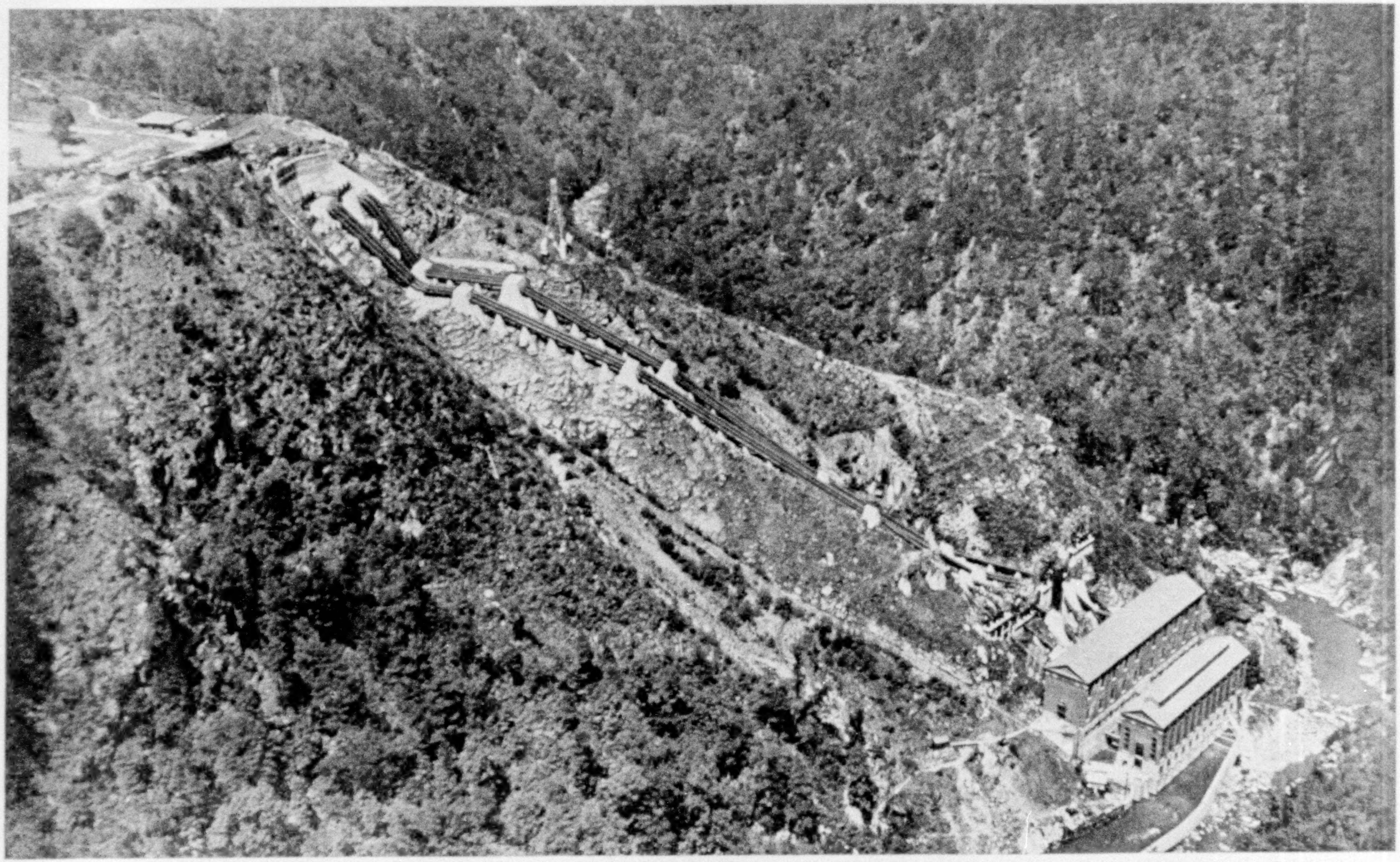
A NATION IN ITSELF IN SIZE AND RESOURCES

In common with many other Georgians living outside the State, the writer's pride had been seared by these facts; so that, after an absence of more than twenty years, he undertook, with much misgiving, a tour of the Commonwealth to see what of good and encouragement could be found within her borders.

Viewed from a distance of a thousand miles, it was difficult to explain Georgia's advertised deficiencies. In physical resources and favored geographical location, no State in the Union occupies a more advantageous position.

The last of the thirteen original Colonies to be settled, Georgia, with an area of more than 59,000 square miles, is the largest State east of the Mississippi. In this particular she is truly a nation in herself, exceeding in size the Republic of Austria, or of Czechoslovakia, Greece, or Portugal, any one of the six Central American republics, or any of the three island republics of the Caribbean. She is larger than England and Wales, or Belgium, the Netherlands, and Denmark combined.

Her situation on the Atlantic seaboard and her diversity of elevation are such that of the nine distinctive climate belts to be found in the United States proper, eight are encountered within her bounds,



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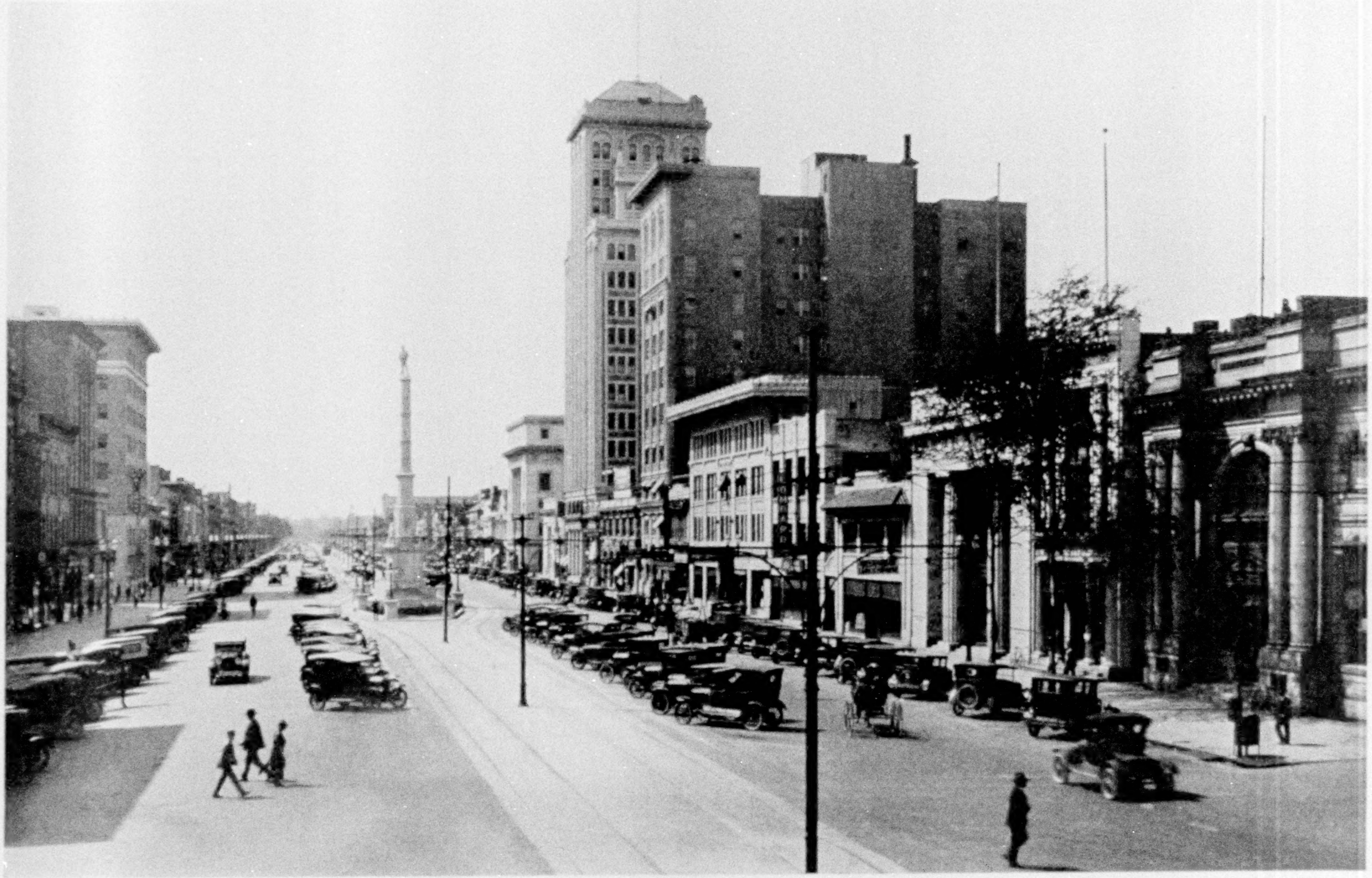
GEORGIA'S LARGEST HYDROELECTRIC PLANT, 108,000 HORSEPOWER CAPACITY

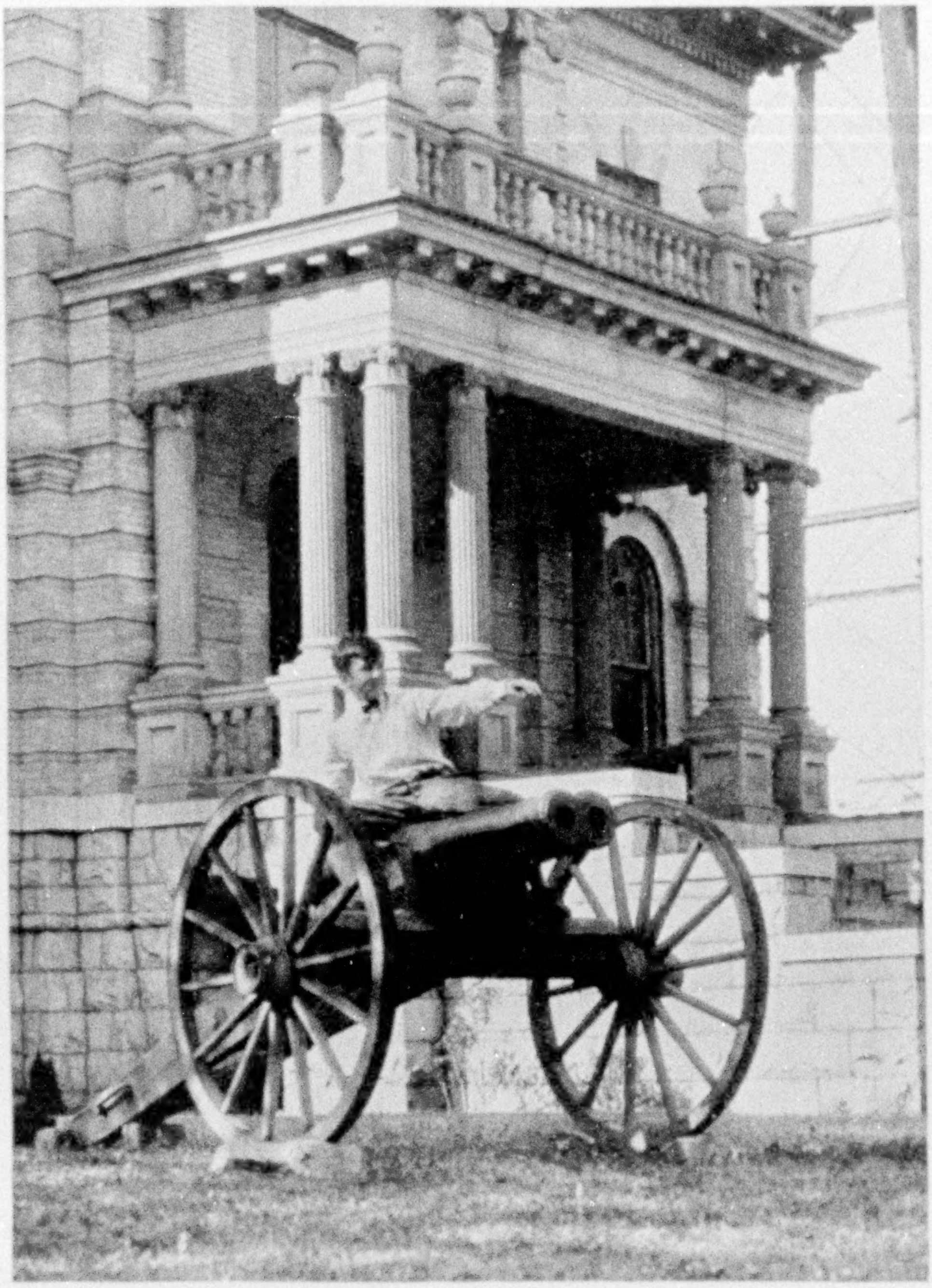
The Tallulah Falls generating station operates under a head, or fall, of 608 feet of water. When the entire development program is completed, the waters of the Tallulah and the Tugaloo rivers will be used six times within an airline distance of approximately 16 miles, the total drop of water being 1,199 feet.



Photograph from J. C. McAuliffe

BROAD STREET, AUGUSTA, IS ONE OF AMERICA'S WIDEST BUSINESS THOROUGHFARES

The city was laid out by General James Edward Oglethorpe, founder of Georgia. Its citizens are especially proud of the Confederate Memorial, in the middle distance, and the lighting system for its streets.



FIRED ONCE, BUT NEVER AGAIN: A DOUBLE-BARRELED CANNON

The inventor of this weapon thought that by loading the two barrels with round shot, linked together by a chain, the enemy could be mowed down by platoons. The first and only time the gun was fired, however, the two charges failed to go off simultaneously, with the result that one of the round shot whipped around on its chain. Fortunately, the gun crew had been skeptical about the novel piece of artillery and had fired it by means of a long fuse, thus escaping death. The relic stands on the grounds of the Civic Center in Athens and shares novelty honors with the tree that owns itself (see opposite page).

with the result that she grows as great a variety of agricultural products as any State in the Union.

In this day, when "back to the farm" has become a national appeal, it is worthy of note that Georgians have remained close to the soil, three-fourths of the entire population being classified as rural, according to the last national census.

Reviewing these facts, the question came to mind, Has Georgia, like the wicked and slothful servant of the parable, hidden her talent in the earth?

I went to see.

A MARBLE MINE TO LAST EIGHTEEN CENTURIES

My sight-seeing pilgrimage began at Tate, a hamlet nestling among those, to the motorist, notorious red clay hills, some 40 miles due south of the point where Tennessee, North Carolina, and Georgia meet.

It is difficult to find Tate on any save a detailed map,* yet from it has gone forth building material for some of the noblest structures of America—the Corcoran Gallery of Art in Washington, the State capitols of Rhode Island, Minnesota, Kentucky, and Arkansas, the Federal Reserve Bank of Cleveland, the New York Stock Exchange, and the Royal Bank of Canada. Tate is the center of the great Georgia marble industry.

The valley where the richest deposit lies is two and a half miles long and a half mile wide, and, as the seam of stone comes to the very surface, Indians were digging marble here for their corn-grinding mortars long before the arrival of the white man.

The marble strata extend to a depth never yet determined, and although

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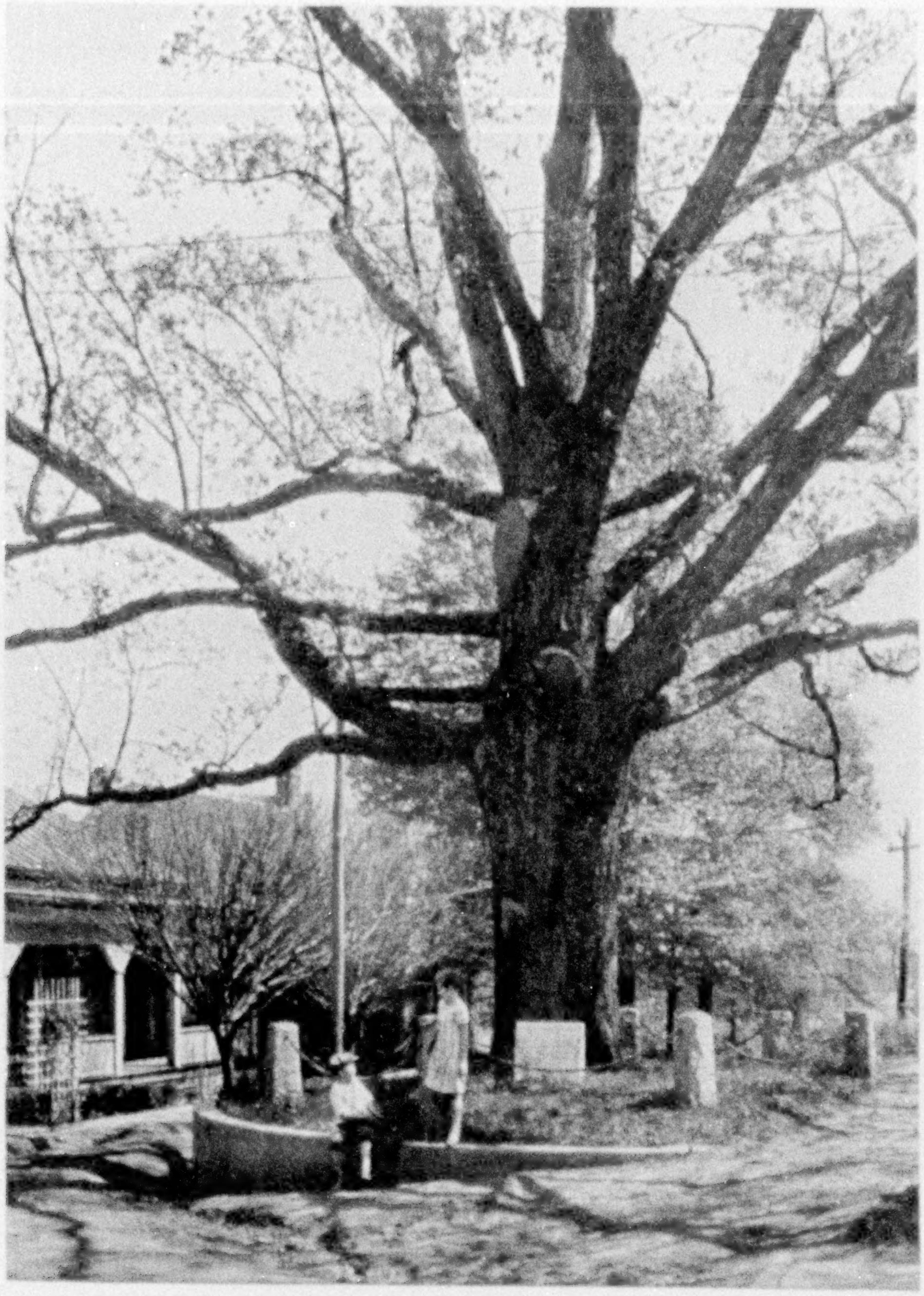
* Additional copies of the North Carolina, South Carolina, and Georgia map supplement, published with this number of the NATIONAL GEOGRAPHIC MAGAZINE, may be obtained from the National Geographic Society at 50 cents per copy, paper edition; $1.00, map linen.

800,000 cubic feet are quarried annually, the second largest output of any marble quarry in the United States, it has been estimated by a Federal expert that this amount could be doubled and there would still be marble to take from this valley eighteen hundred years hence!

A perennial stream flows through the valley, providing the necessary water for the marble works, and, as snow seldom falls in this section, the quarries are in operation every week day in the year.

When the marble pits reach a depth of 200 feet, the drillers transfer their machinery to another plot of ground, scrape off a few inches of soil, and begin anew. The old pits are abandoned at this point, not because of any deterioration in the uniform quality of the marble, but merely because it's a long climb for the workmen down and up the ladders (see illustration, page 286).

At the time of my visit, a cube of marble estimated as weighing 76 tons, one of the largest blocks ever quarried in America, lay in the bottom of one pit ready to be partially shaped before shipment to Chicago for the Buckingham Memorial Fountain.



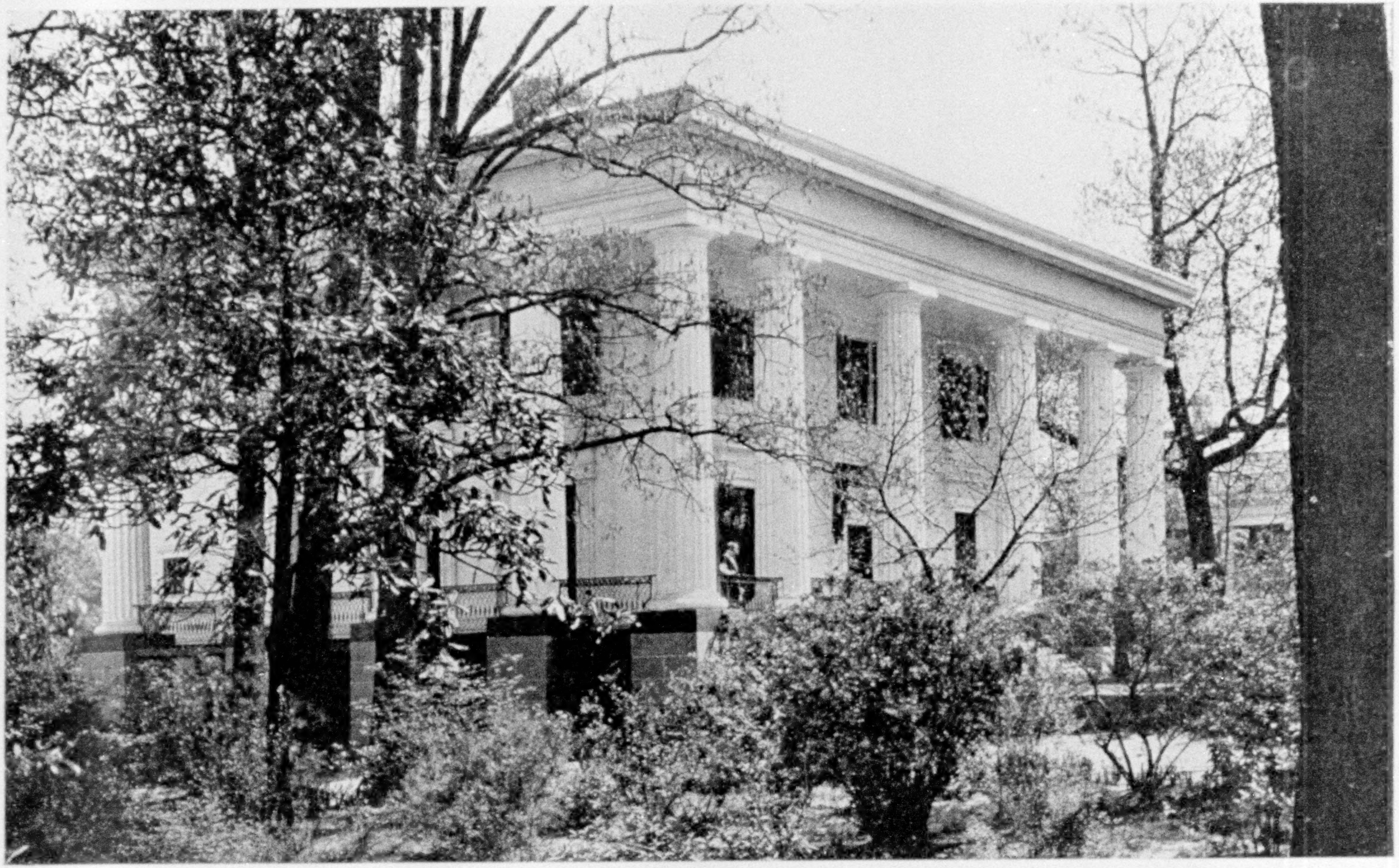
A TREE THAT OWNS ITSELF

In the residence section of Athens stands this fortunate oak, which once afforded shade for the owner of the property on which it stands. In gratitude, this Athenian deeded the tree to itself, and the following inscription appears on the marble marker at its base: "For and in consideration of the great love I bear this tree and the great desire I have for its protection for all time, I convey entire possession of itself and all land within 8 feet of the tree on all sides.—William H. Jackson."

HIGHWAYS SURFACED WITH MARBLE

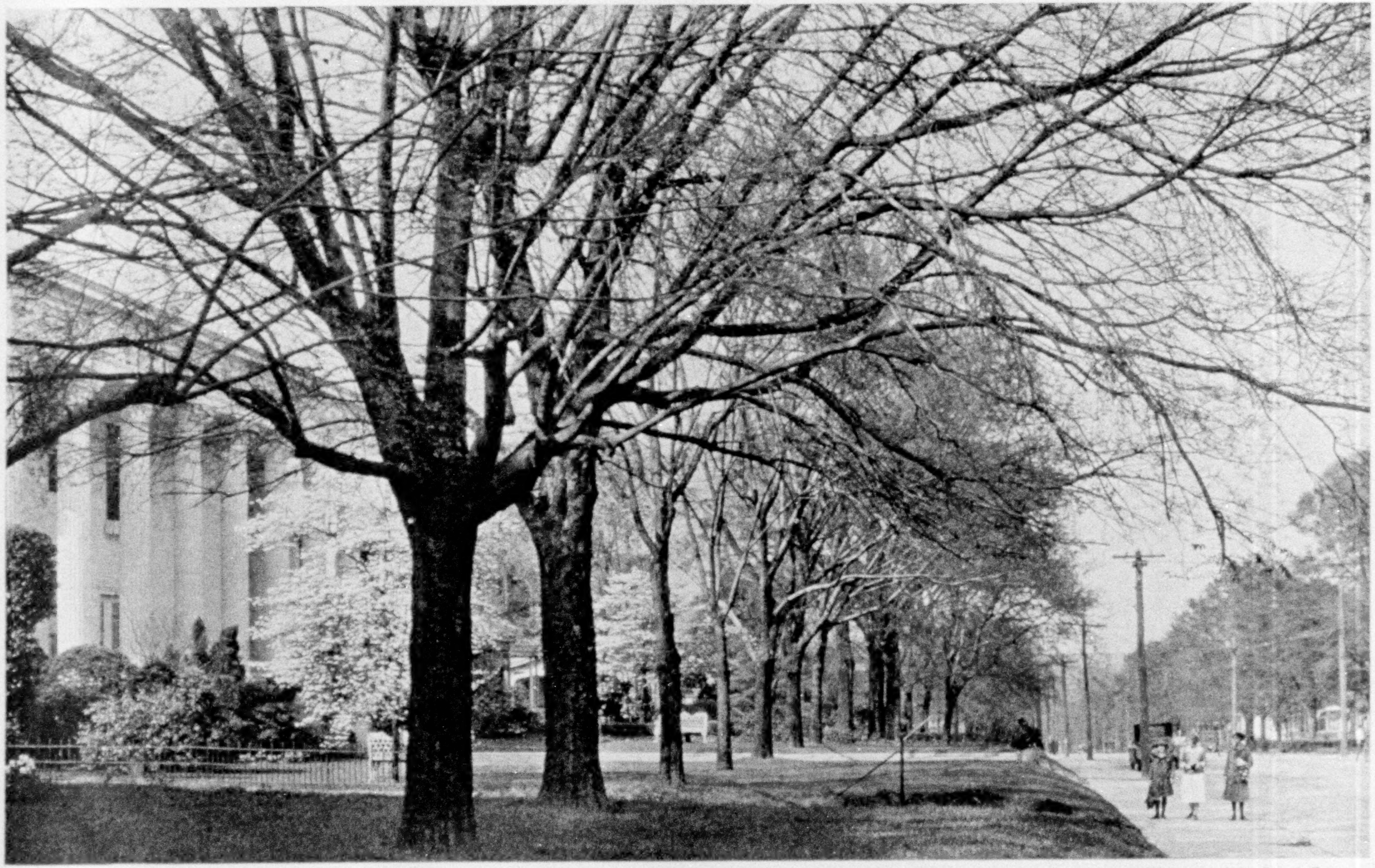
Aside from the lovely color tones of its three varieties—pink, white, and silver gray—the characteristics of Georgia marble which commend it so highly to architects are its nonabsorptive quality and its uniformity of texture. It was the latter feature which caused its selection for the colossal statue of Lincoln in the Lincoln Memorial at Washington.

Situated on a knoll commanding an incomparable view of the fabulous valley stands the magnificent mansion, now nearing completion, of the owner of this and other near-by quarries. Although it is a structure suggestive of the opulence of the Cæsars, it is built of pink marble not



ONE OF THE MANY COLONIAL HOMES WHICH LEND ATMOSPHERE TO ATHENS

This was formerly the residence of Henry W. Grady, Georgia's best beloved journalist, who devoted his life to the advancement of the New South. Among other Georgians who have lent luster to American literature were Joel Chandler Harris, of Atlanta, creator of the "Uncle Remus" tales; Sidney Lanier, of Macon, whose "Sunrise," "Corn," and "The Marshes of Glynn" are among the finest poems in the language; Will N. Harben, of Dalton, chronicler of north Georgia mountain life, and Father Ryan, the poet priest of Augusta.



Photograph by Jacob Gayer

A STREET IN THE RESIDENTIAL SECTION OF MACON

Photograph from Onie M. Nash

NAPPING IN A COTTON FIELD

One of the satirical reasons which has been given for the perpetuation of the cotton fields of the South is that the men wish to plant a crop which will give the women and children something to hoe and harvest; but King Cotton's contribution to the income of the South for the year ending June 30, 1926, was in the neighborhood of a billion and a half dollars, and Georgia's share of this was more than $100,000,000.

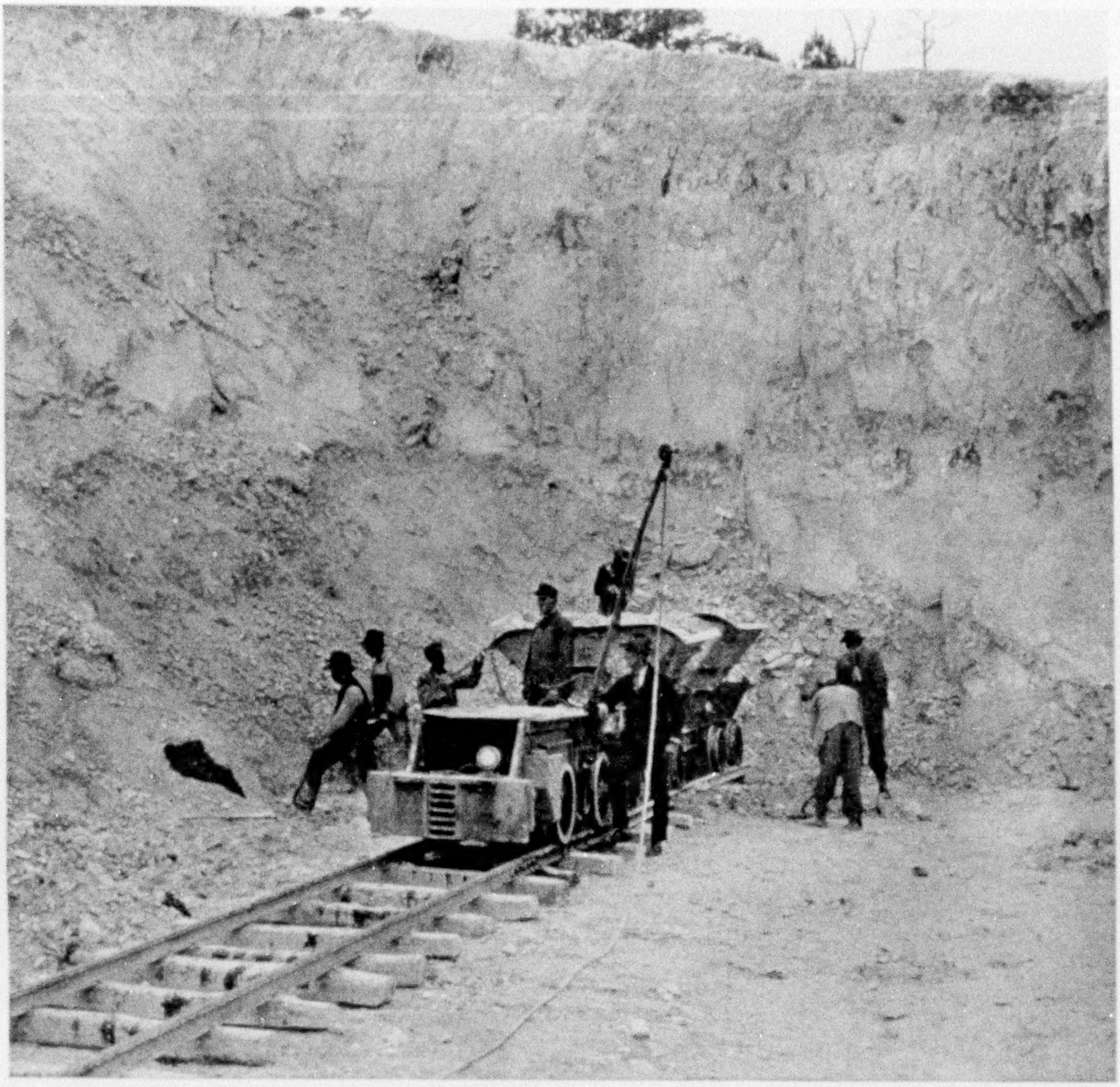
in ostentation, but because this was the material at hand. In fact, in this part of Pickens County the very highways are surfaced with crushed marble and the chimneys of the one-room cabins of the hill-folk are built of marble slabs.

THE STATE IS AWAKENING TO HER HIGHWAY DEFICIENCIES

A two hours' motor trip from Tate brings the tourist to Atlanta, when the well-graded but unmetaled clay roads are dry; the time may stretch into eternity in rainy weather, when they become as slick as glass.

Although the wealthiest counties of the State—such as Fulton, Clarke, Ware, Bibb, Chatham, and Glynn—have their own excellent paved highways, there is no dodging Georgia's deficiency with respect to many of her roads. A brighter day is promised, however. The good-roads movement is being discussed with enthusiasm on every hand and the State's ambitious program includes the paving of a system of roads from county seat to county seat, which, if consummated, will give a north-to-south and east-to-west highway for every county.

Our trip was made in fair weather and



IN A KAOLIN PIT AT GORDON

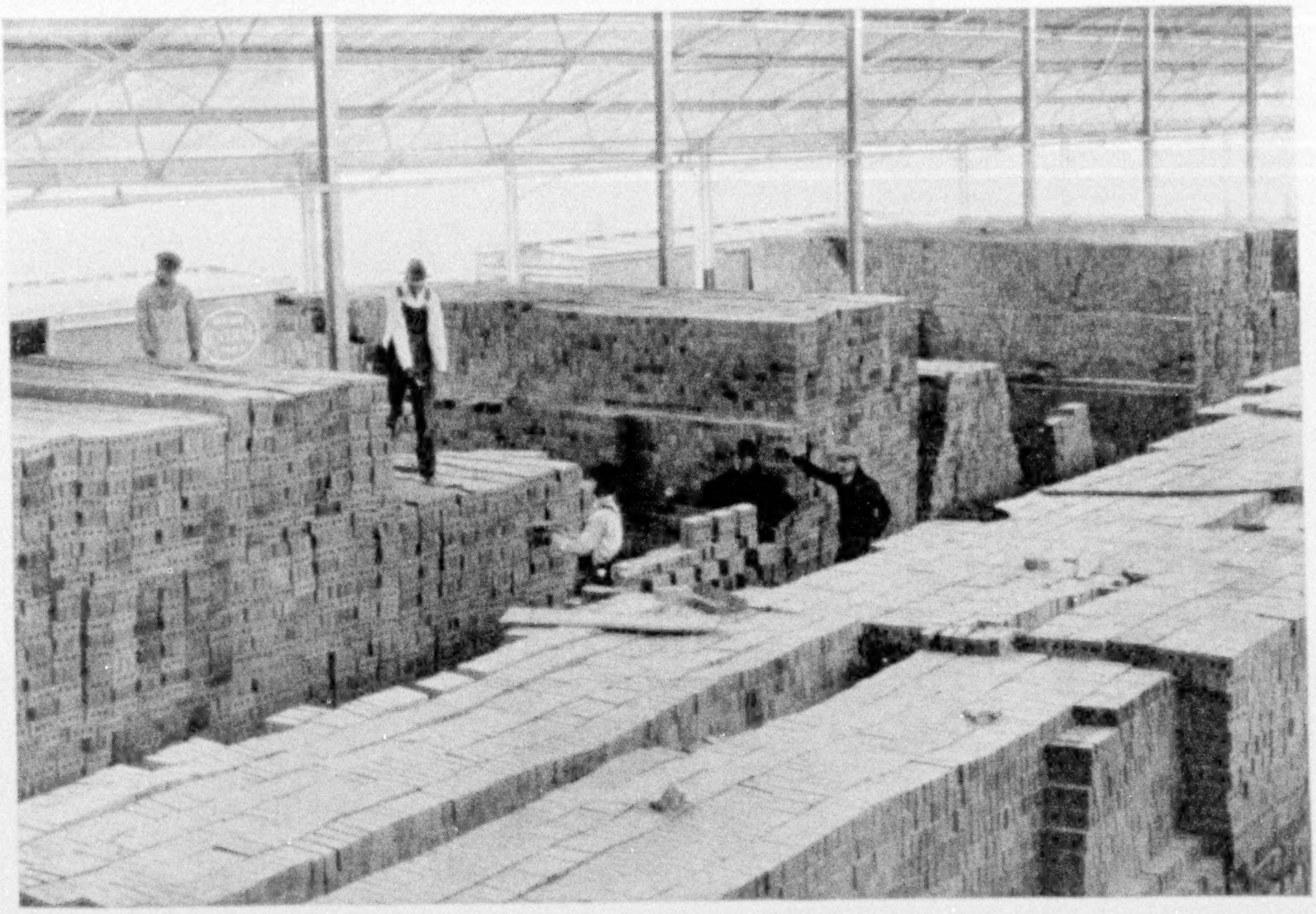
This clay is used in the manufacture of white brick (see text, page 291, and illustration, page 268). Georgia's kaolin and refractory clays are found in a belt deposit 20 to 50 miles wide, running across the State from Augusta to a few miles below Columbus.

we arrived without motor casualty in the city which is the State's most effective advertisement, if one excepts the Georgia peach and the Georgia watermelon.

The largest city of the South Atlantic States, Atlanta has always prided herself upon her ultraprogressive spirit, a spirit which more leisurely communities of the State, with somewhat scornful and tenacious sectionalism, characterize as "Yankee." She glories in the imputation and becomes more and more "yankeefied," setting herself the task of proving that because an individual lives south of the Mason and Dixon Line he does not necessarily think and act in ante bellum fashion.

There is a tradition that when the first railway was projected through this part of the State the wealthy citizens of the sedate town of Decatur refused to allow the noisy common carrier to locate its tracks or its station nearer than five miles of their community's confines. Thus the crossroads of Marthasville was established. To-day, Marthasville (Atlanta) is one of the great railway and banking centers of the United States, and Decatur, while a separate town organization, is merely one of the environs of that despised village of 75 years ago.

Atlanta owes many of the towns of Georgia a debt which she will never be able to pay. For a quarter of a century



GEORGIA KAOLIN BRICK MANUFACTURED AT GORDON

Note the holes punched through each brick to reduce the weight and facilitate drying (see text, page 291).

she has arrogated to herself the best youth of the Commonwealth. Go into any community and inquire about its most promising young men of five, ten, fifteen, or twenty years ago, and in the majority of cases the answer will be, "Oh, he moved to Atlanta a while back; he thought greater opportunities awaited him there."

Nowadays, however, that situation is changing. A score of towns with progressive boards of trade, like Albany, Americus, Valdosta, Waycross, Brunswick, Rome, La Grange, and Columbus, are presenting opportunities that warrant the boys just out of college in staying at home and developing the regions close at hand.

One cannot talk with Atlantans or tour the city's busy, twisting streets without acquiring the superlative habit. The visitor is enthusiastically bombarded with statistics about the "biggest mattress factory in the United States" (or is it in America, or in the world?), "the largest roofing plant in the South," "the most colossal monument of all time," "the largest colony of millionaires per capita in the country," "the biggest mail-order concern in the South, with a prospective business of $30,000,000 a year," and so on.

But a city may have the greatest shoe-button factory on the hemisphere or soap plant in Christendom and still not be a place of which to boast. Atlanta has something besides sheer bigness of enterprises and multiplicity of millionaires' estates in which she may properly take pride.

Her citizens have an incomparable community spirit, which has won and will continue to win many civic and State victories.

Tremendously energetic and aggressive, a bit contemptuous of her more slow-moving sister cities, Atlanta is, withal, a credit to Georgia and to the New South.

HYDROELECTRIC DEVELOPMENT AND COMMUNITY OF INTEREST

Atlanta's week of Metropolitan Grand Opera is an evidence of the way in which the city's community spirit works. This annual event has outgrown the highest expectations of its initiators, and to-day the spring visit of the New York organ-

Photograph by Jacob Gayer

DUSTING PEACH TREES TO COMBAT INSECT PESTS IN PEACH COUNTY

ization attracts its tens of thousands, not merely from all parts of Georgia, but from the entire South.

The Atlanta spirit sometimes presents an entirely different aspect. For example, a year ago the major power company of the State faced a critical situation, following three successive dry summers in north Georgia, a region which ordinarily has the highest average rainfall east of the Mississippi River.

The company's hydroelectric plants, which in normal times furnish most of the power for factories representing a capital investment of nearly half a billion dollars, found their output of kilowatts alarmingly curtailed.

Now, public-service corporations are the spellbinding politician's chief stock in trade, his "octopi preying upon the body politic," and the parent companies of Georgia's consolidated power concern were the targets for continuous attack fifteen years ago.

But when last year's emergency arose the company called in conference the consumers of its hydroelectric power, set forth the situation, and suggested a partial solution of the difficulty—a staggering of working hours, some factories to work at night, others to run by day. Coöperation was immediately pledged and the situation saved.

To-day, because power seller and power buyer have gone through a period of sacrifice and mutual helpfulness, a better spirit actuates the entire relations between public-service corporation and public.

And, best of all, with public support, a further consolidation of interests has been effected within recent months, whereby the water-power resources of northwest Alabama and north Georgia have been pooled. The hydroelectric systems of the two States are now linked up, so that during the past summer many of the factories of north Georgia were operating on power supplied by Alabama water, while the Georgia streams were being diverted to reservoirs, thus creating a reserve, so that no succession of dry summers ever again can cause a power famine such as that of 1925.

The development of water power has

THE ETOWAH GROUP OF INDIAN MOUNDS ON THE TUMLIN FARM NEAR CARTERSVILLE

The Department of Archeology of Phillips Academy, Andover, Mass., has been excavating these mounds for several years. The largest of the group is about 70 feet in height, with 380 feet base diameter. Historians and ethnologists disagree as to whether De Soto visited this group, but no objects of Spanish origin have been unearthed. Nearly 100 burials have been discovered in one mound, as well as a profusion of highly artistic carvings and flint workings, denoting a superior culture. There is also an important group of mounds in Early County, southwest Georgia.

been one of the most potent factors in the tremendous industrial strides made by the State during the last eight or ten years, for while Georgia came to a full realization of the potential value of her white-coal resources considerably later than North Carolina, her hydroelectric development is now on a par with that of the Tarheel State, each utilizing in the neighborhood of 500,000 horsepower, with 2,000,000 as the ultimate goal* (see illustration, page 260).

CLAYS TO RESTORE WEALTH DESTROYED BY BOLL WEEVIL

Atlanta is justly proud of her educational institutions, chief among which is the Georgia School of Technology, commodiously housed in a large group of well-equipped buildings. It has an enrollment of more than 2,000 students, and its graduates have contributed materially toward the industrial development of the South during the last two decades.

In discussing the recently established School of Ceramics at "Tech," the president of this progressively administered institution confided that at the annual meeting of the American Ceramic Society, held in Atlanta a few months ago, a number of the technical experts of the organization expressed the belief that within ten years this new department will have brought to Georgia in material wealth (by the development of the State's kaolin deposits, see text, page 291) more than the boll weevil has taken away.

Atlanta is also the seat of Emory University, of Oglethorpe University, and of Agnes Scott (in Decatur), a girls' college of high scholastic reputation.

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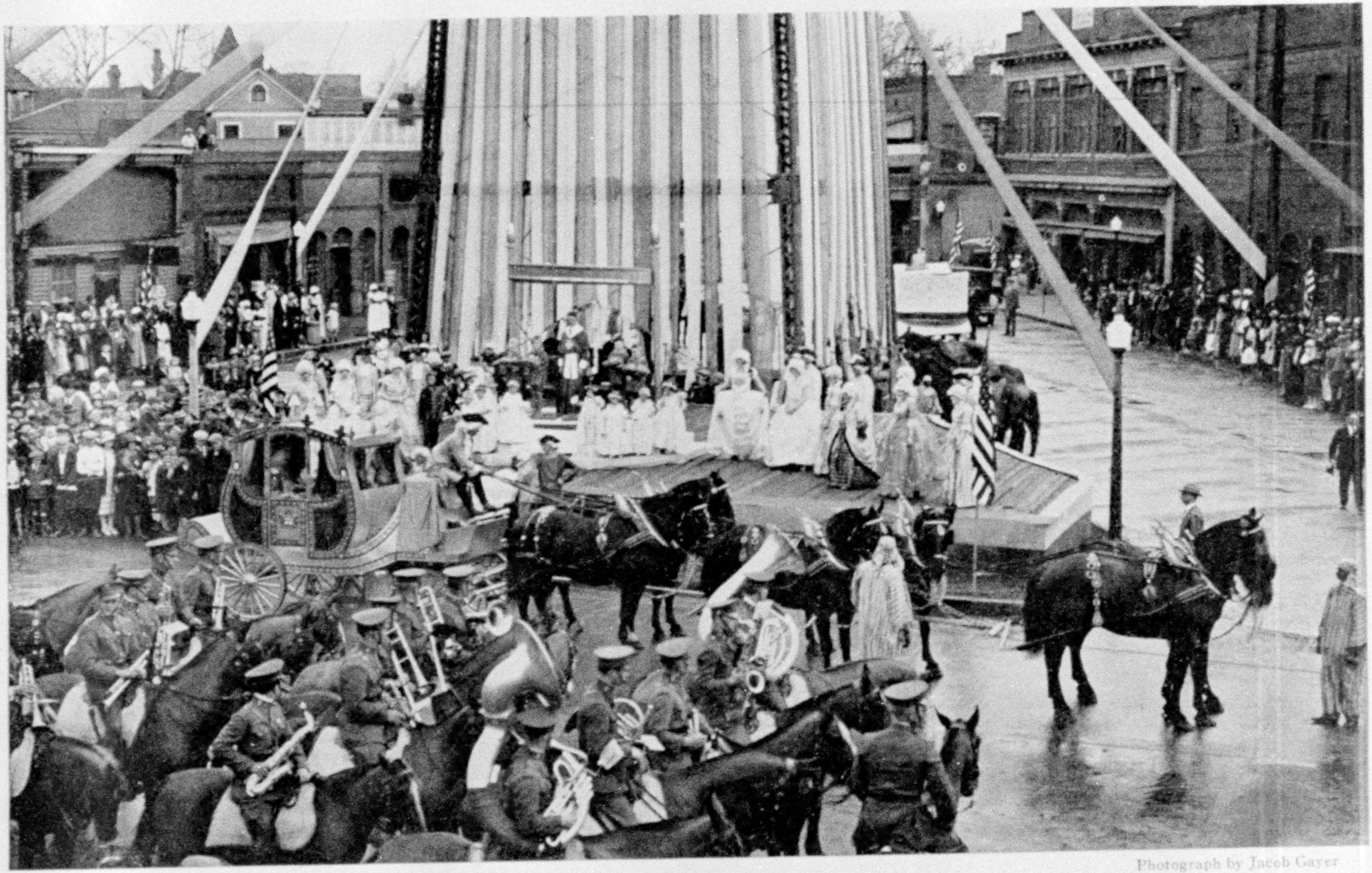
* See, also, "Motor Coaching Through North Carolina," by Melville Chater, in the NATIONAL GEOGRAPHIC MAGAZINE for May, 1926.



Photograph by Jacob Gayer

AFTER THE CORONATION CEREMONY AT THE FOURTH ANNUAL PEACH BLOSSOM FESTIVAL AT FORT VALLEY

Thousands of visitors flock to the county seat of Peach County each spring to see the elaborately staged pageant setting forth in allegory the migration of the peach from its birthplace in the East to its adopted home, the Georgia peach belt.

Photograph by Walter Layman

SAVANNAH'S STATUE OF JAMES EDWARD OGLETHORPE, FOUNDER OF GEORGIA

In a near-by square is a bowlder monument to Tomochichi, the friendly Indian chief from whom General Oglethorpe purchased the site for Savannah, on a 40-foot bluff 18 miles from the mouth of the Savannah River.

The city is a center for negro education, among the most important colleges being Atlanta, Clark, and Morris Brown Universities, Spelman Seminary, and Morehouse College. These institutions are making a commendable fight against the illiteracy handicap under which almost one-third of the colored race in the State labors.

EDUCATIONAL FORCES WOEFULLY UNDERPAID

The subject of education naturally takes the investigator to Athens, seat of the State University and a charming old place of stately colonial homes, embowered in oak groves and rose gardens (see pages 264 and 283).

It is a source of chagrin to those who are proud of Georgia to recall that no State in the Union began its educational career with higher promise and none has fallen so far short of fulfillment.

Georgia was the first State in the Union to establish a State university, and Wesleyan, founded at Macon in 1836, was a world pioneer among women's colleges; yet to-day the Commonwealth ranks at the very bottom of the list of States in her per capita expenditures for educational purposes, and only six States in the Union have a higher percentage of illiteracy. The higher institutions of learning are especially handicapped by lack of funds both for equipment and for salaries.

It has been offered in extenuation that Georgia has to bear more than 11 per cent of the entire Nation's "white man's burden" for education of the colored race. Negroes comprise more than two-fifths of the State's population, but pay less than one-twentieth of her taxes. The proponents of a more liberal educational policy maintain that this unfortunate condition presents a challenge to the State to rise to the occasion as a matter of self-interest as well as of justice to her sons and daughters.

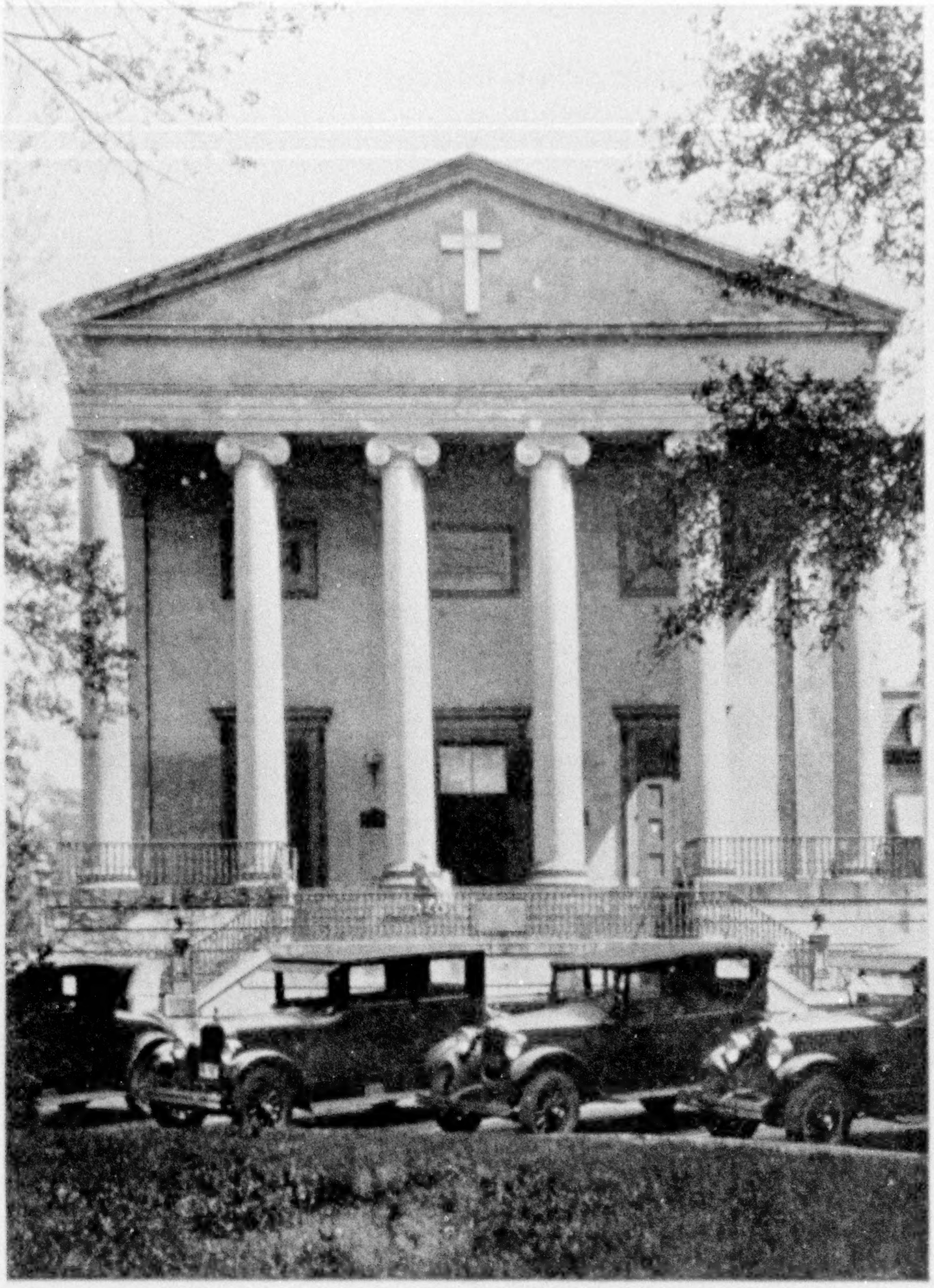
A more hopeful situation is to be found

in the rural school system. In the summer of 1925, 170 new school buildings were completed throughout the State, at a cost of more than two million dollars.

In Decatur County, for example, a progressive young county school superintendent, a graduate of the State University, has in four years practically blotted from the landscape the one-teacher, one-room schoolhouses. In their places have risen well-lighted, well-ventilated consolidated schools with competent teaching staffs.

Children throughout each consolidated district are collected by motor busses in the morning and returned to their homes in the afternoon, but the circuit traversed in certain communities is so great that some of the pupils are forced to spend four hours a day in automobiles, a condition which can only be remedied by legislative awakening.

In many of the prosperous towns and cities of the State the grammar and high schools are on a par with the best in America.



CHRIST CHURCH, SAVANNAH: ON THE SITE OF JOHN WESLEY'S CHAPEL (SEE, ALSO, PAGE 296)

The founder of Methodism was the third rector of the first church erected in Savannah by Oglethorpe's colonists. Here he established what was reputed to be the first Sunday school (see text, page 293).

AUGUSTA'S CHERISHED HISTORICAL ASSOCIATIONS

It is a pleasant automobile journey of 100 miles from Athens, by way of Washington and Thomson, to Augusta, at the head of navigation on the Savannah and the center of the cotton manufacturing industry of Georgia.

Augusta is known in the North and East chiefly as a health resort and for its splendid golf links, but Georgians cherish its historical associations. James Oglethorpe, the philanthropist who settled the colony of Georgia, founded the city nearly 200 years ago, naming it for the then Princess of Wales.

It was from Charleston, South Carolina, to Hamburg, across the river from Augusta, that the first American-built locomotive, the *Best Friend*, was operated 96 years ago, and here lived William Longstreet, who received a steamboat patent from his State in 1788, but was not able to operate his invention successfully until twenty years later, a year after Robert Fulton's *Clermont* was navigating the Hudson.

Both Augustans and Savannahians

claim that it was on a farm in the environs of their respective cities that Eli Whitney, a Massachusetts school teacher, devised and set up the first cotton gin, a machine which truly revolutionized the cotton industry of the world. In 1792, the year of the invention, the United States exported only 379 bales of cotton; for the year ending June 30, 1926, the South exported more than one-half of its crop of sixteen million bales!

Fifteen miles from Augusta is Silver Bluff, where Hernando De Soto camped in 1540, and Spanish chroniclers tell us that it was with difficulty that he induced his followers to continue their wanderings, which led to the discovery of the Mississippi, because they wished to remain and found here a settlement in the "pleasantest place" on American shores.

Augusta lies in the great kaolin belt, 20 to 50 miles wide, which extends for more than 200 miles across the State to Columbus. It is by developing the best means of utilizing this kaolin that the students in the School of Ceramics at the Georgia School of Technology are expected to make their notable contribution to the wealth of this section (see text, page 291). Already the clays are being mined extensively, but unsystematically and uneconomically. They constitute a new "crop" for the farmer who as yet uses little selective judgment in grading his cargo before shipping to northern pottery works.

GEORGIA'S CHAPTERS IN OUR MINERAL HISTORY

In addition to her kaolin beds and her marble and granite deposits, Georgia's hills and mountains contain a diversity of wealth in clays and minerals, which provide fascinating subjects of study for the metallurgist. Geological experts who have analyzed her resources assert that "of the 52 known commercial minerals, more than 40 are to be found within the bounds of the State." A majority of these are present, of course, only in such quantities and in such chemical combinations as to be of interest solely to the laboratory student.

On the other hand, many interesting chapters in the mineralogical history of the United States have been written by Georgia.

The first bauxite mined in America came from this State, 34 years ago, and while Arkansas has since assumed leadership in the output of this valuable ore from which aluminum is obtained, Georgia holds second place, her bauxite being used chiefly in the manufacture of artificial abrasives, the production of alum, aluminum sulphate, and other chemicals for water purification, dyeing, and tanning.

More than half of all the ocher produced in the United States comes from Georgia deposits. The ore is used extensively as a pigment in paints and as a filler in linoleum. The State was also for years the country's chief source of supply for asbestos. The latter has ceased to be of economic importance, however, since the rich Canadian and South African deposits have been developed.

Georgia's gold mines have produced nearly $18,000,000 worth of the yellow metal; but their days of productivity seem to be over also, although Dahlonega, in Lumpkin County, still hopes for a revival of the industry.

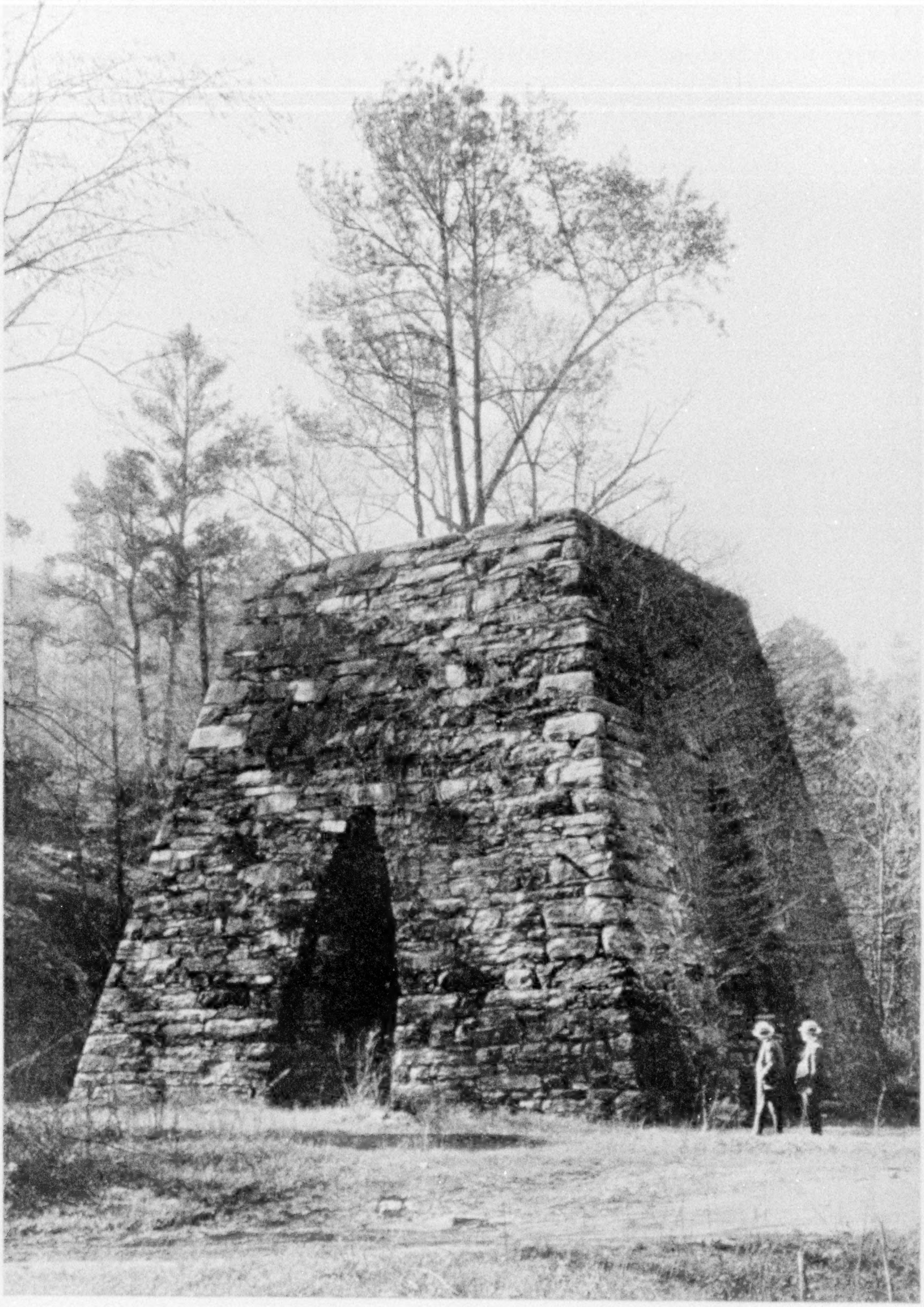
IN THE HEART OF THE PEACH COUNTRY

Leaving Augusta's broad thoroughfares (see page 261), we go by motor to Macon, the former's rival for third place among the cities of the Commonwealth.

Situated at the geographical heart of the State, Macon is the great market center for the fruit industry. Here the peach and watermelon growers maintain their coöperative organizations, and here one learns that it is not the bigness of the crop which means the greatest return to the orchard owners of Fort Valley, Marshallville, and other communities that have enjoyed 26 consecutive peach crops—a record for the United States.

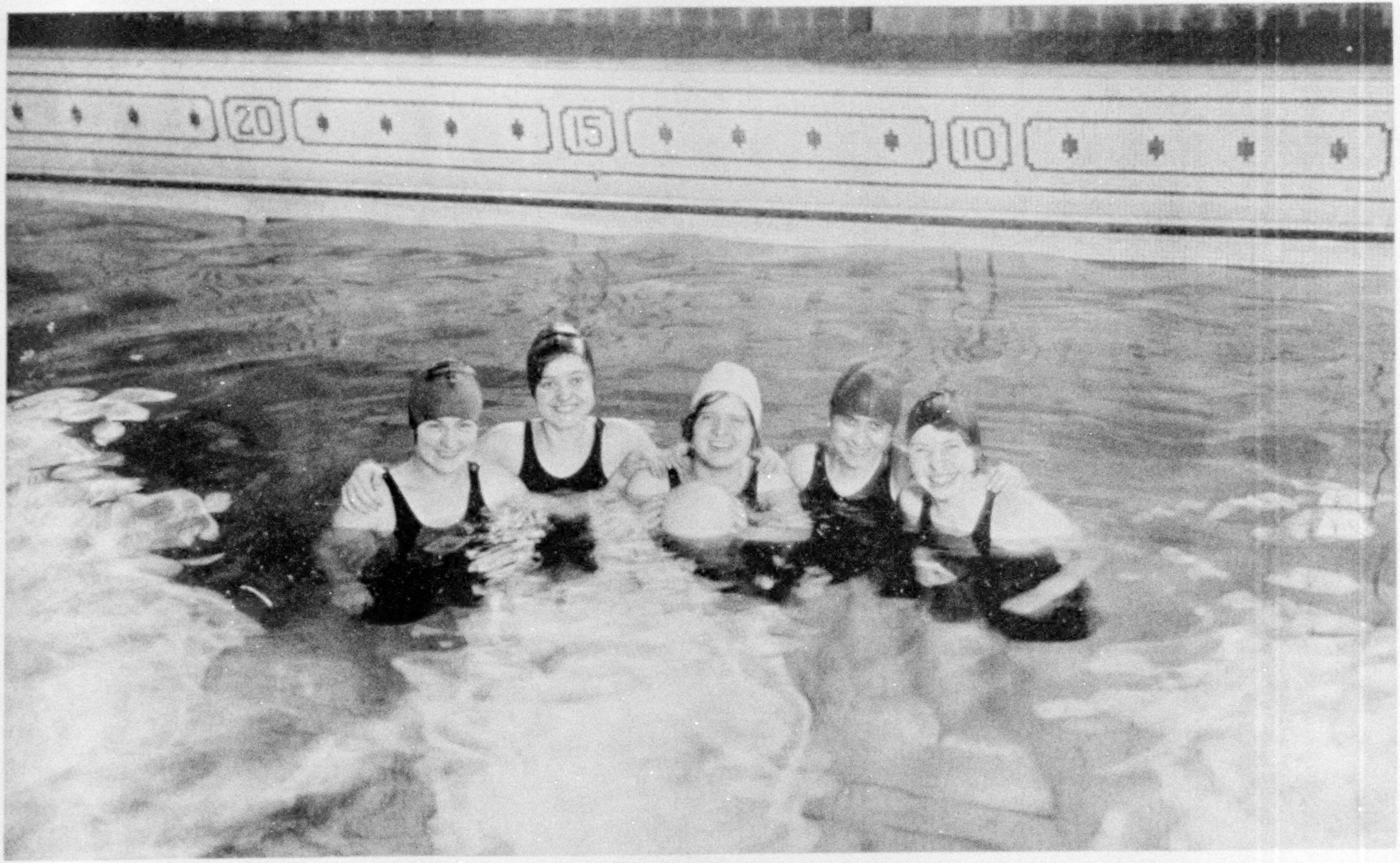
My visit to Georgia was timed to coincide with the annual Peach Blossom Festival at Fort Valley, a colorful, magnificently staged historical pageant which was inaugurated five years ago and which now attracts thousands to this progressive little town in the heart of the peach belt.

A few hours after the 1926 pageant there came a killing frost! Two nights later I was in Bainbridge, 125 miles to the south, when the owner of one of the largest crate factories of that section was called to the telephone. Upon returning



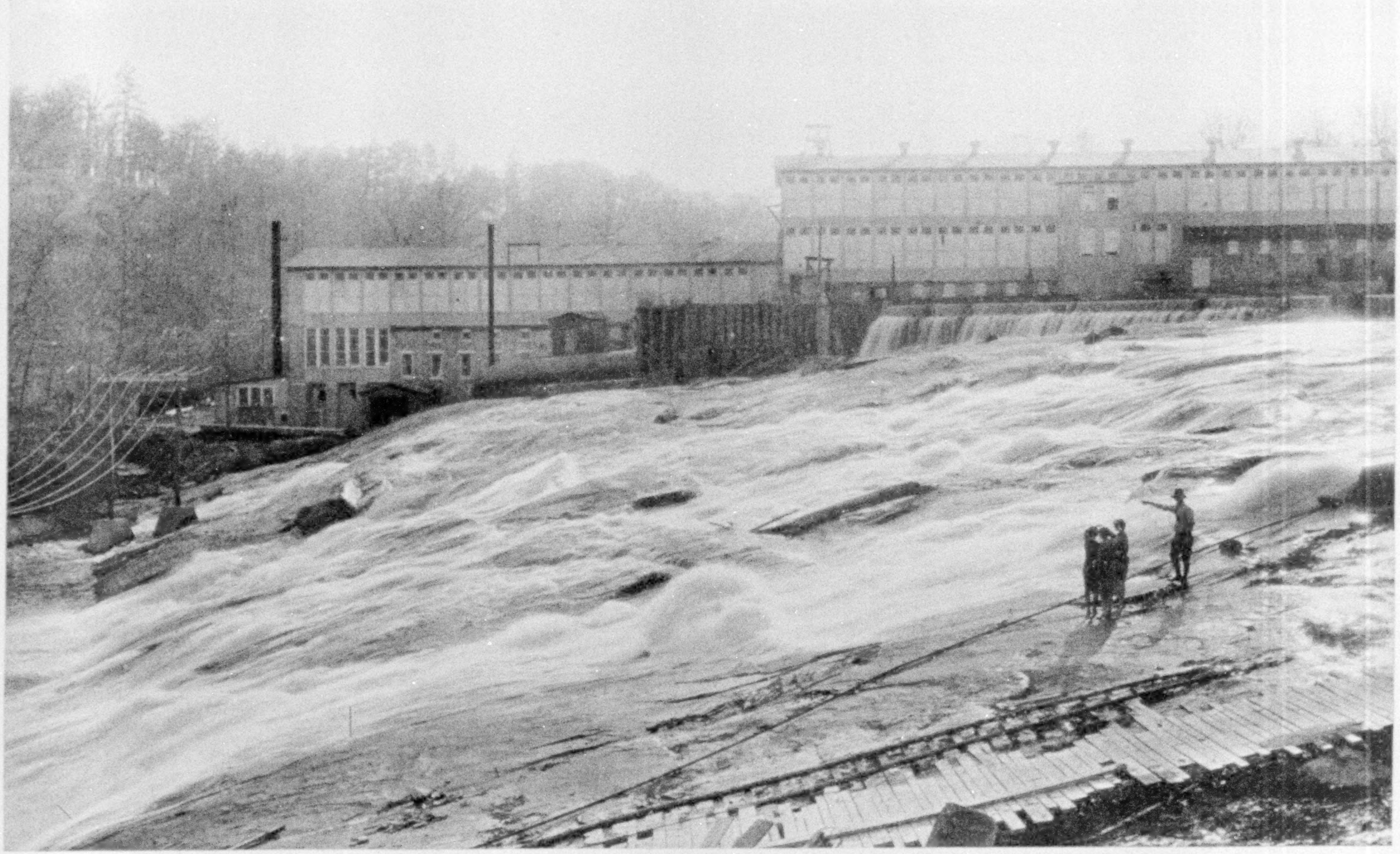
RUINS OF COOPER'S IRON WORKS NEAR CARTERSVILLE

This furnace, on top of which grow several sturdy trees, helped to supply the South's armies of 1861-1865 with cannon. It was destroyed by General Sherman on his March to the Sea. Iron, manganese, ocher, bauxite, barite, and limestone deposits are to be found in Bartow County, of which Cartersville is the county seat.



IN THE SWIMMING POOL: GIRLS OF SHORTER COLLEGE, ROME

Sectarian institutions are much in vogue in the South. In Georgia the Baptists support Mercer University at Macon and Shorter at Rome; the Methodists have Emory University in Atlanta and Wesleyan (see page 285) in Macon; the Presbyterians have Oglethorpe University near Atlanta and Agnes Scott in Decatur.

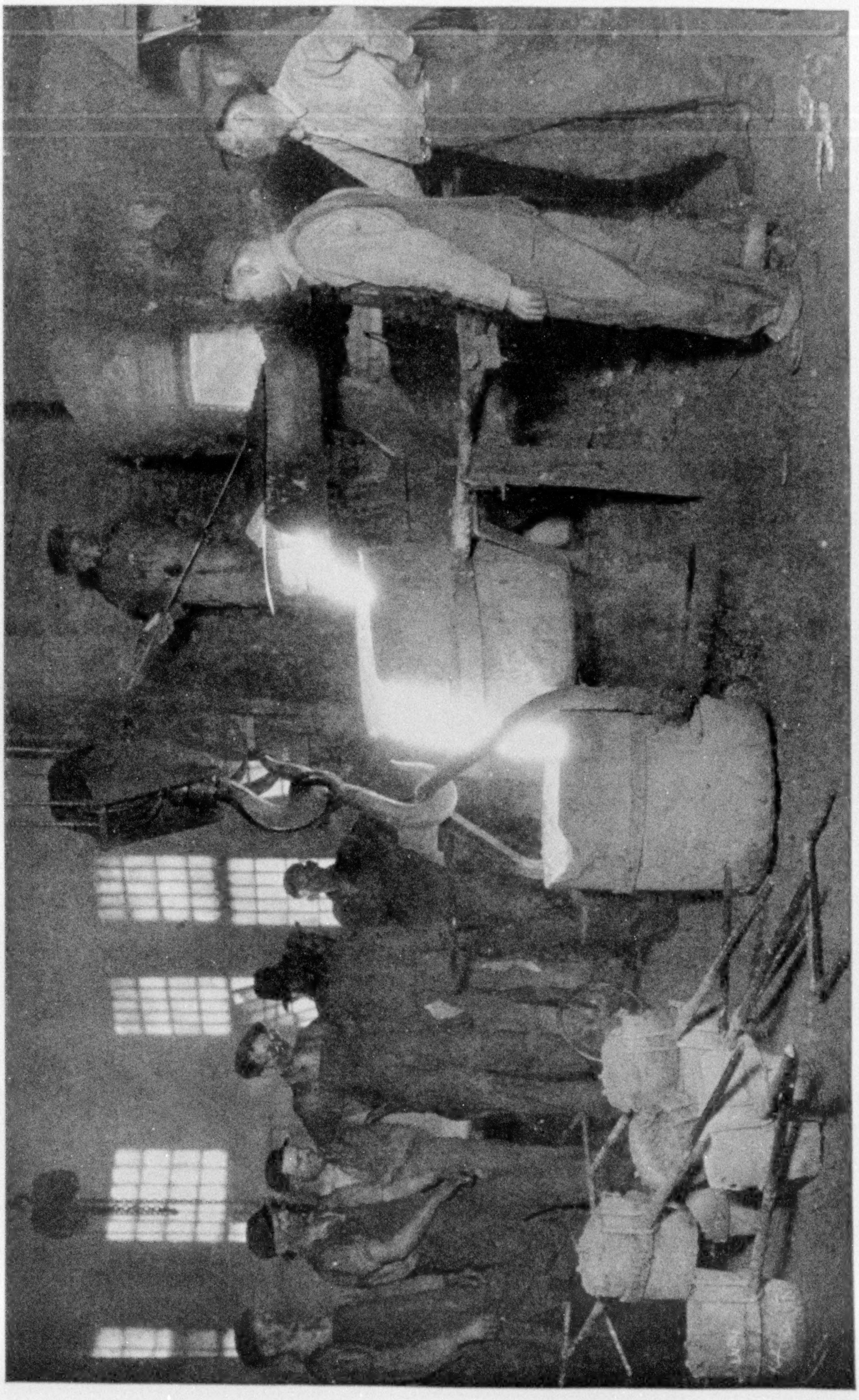


A COTTON MILL ON THE SOQUE RIVER RAPIDS NEAR CORNELIA

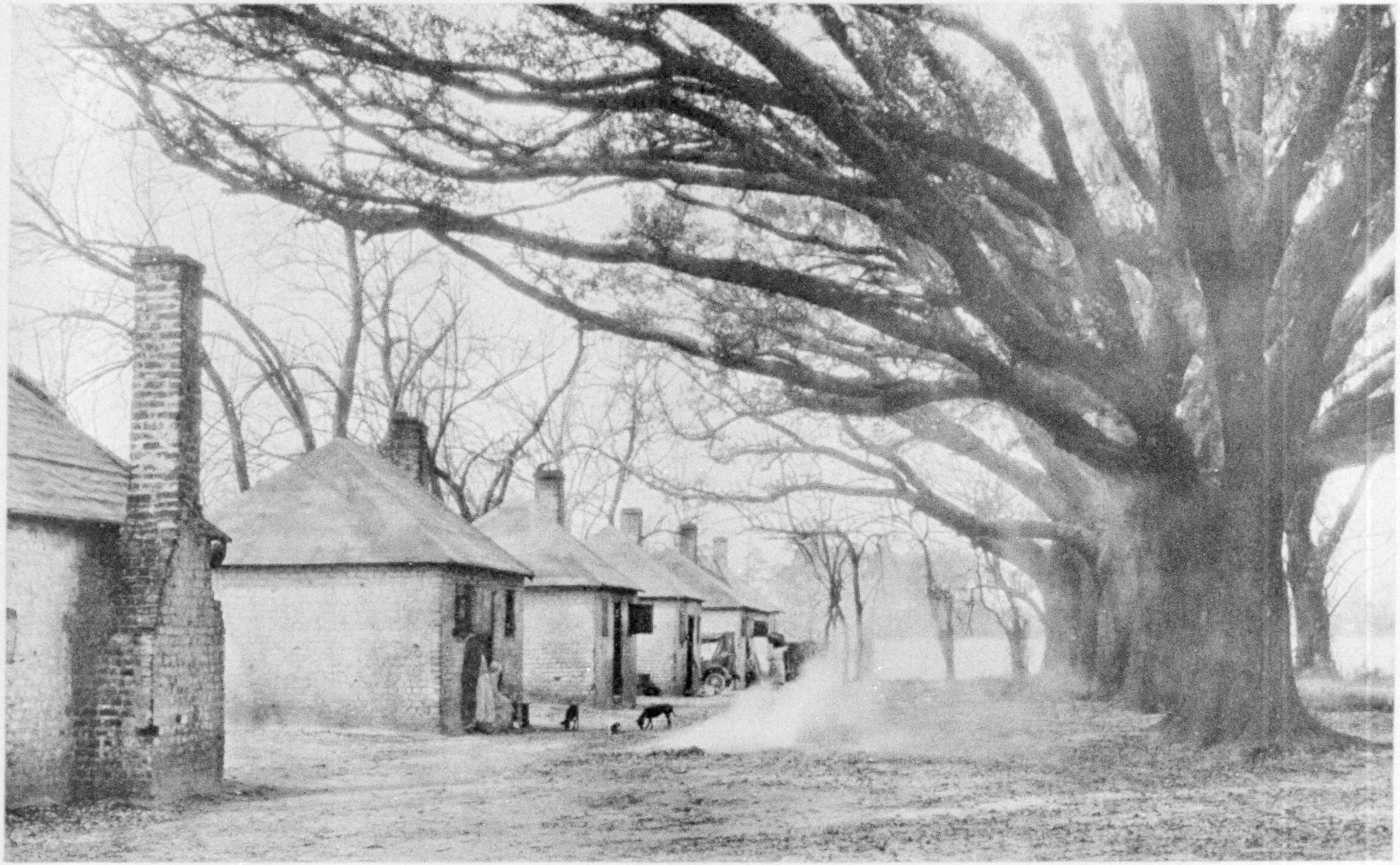
The development of Georgia's white coal resources has been an important factor in the State's recent advance industrially.

SUNSET HOUR ON COFFEE BLUFF, OVERLOOKING THE ESTUARY OF THE OGEECHEE RIVER

Among the negroes living on the Ogeechee River a patois, developed in ante bellum days, has persisted. It impresses the stranger almost as a new language. The origin of "Geechee," as the patois is called, is explained by the fact that slaves employed on the old rice plantations were more or less isolated and rarely conversed with their white owners, with the result that their knowledge of English words was slight and the pronunciation of them was bizarre. The "Geechee" negro speaks in a sort of staccato and always seems excited when talking. His patois is encountered all along the Georgia coast.

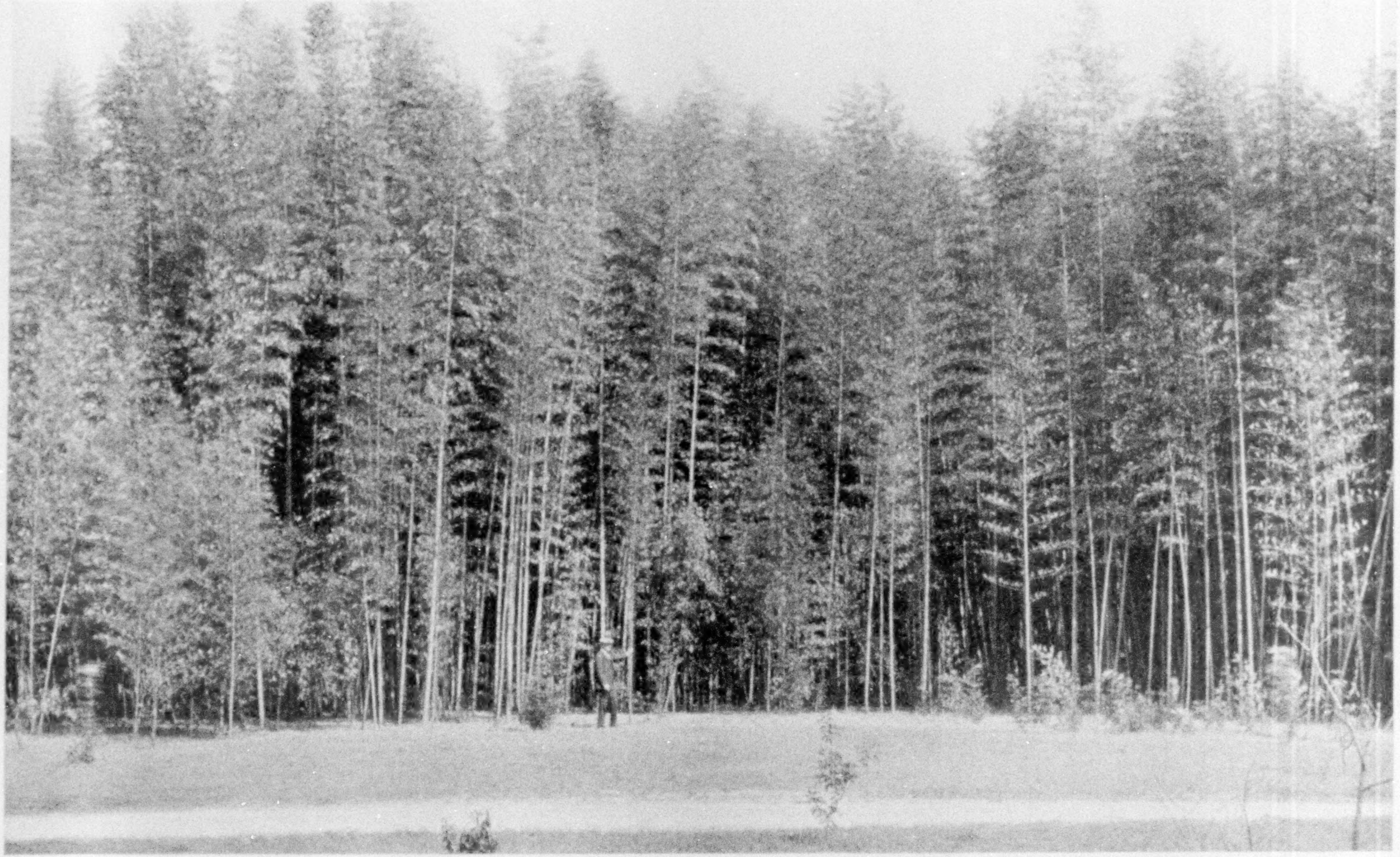


TAPPING A CUPOLA: INTERIOR OF AN IRON FOUNDRY IN MACON



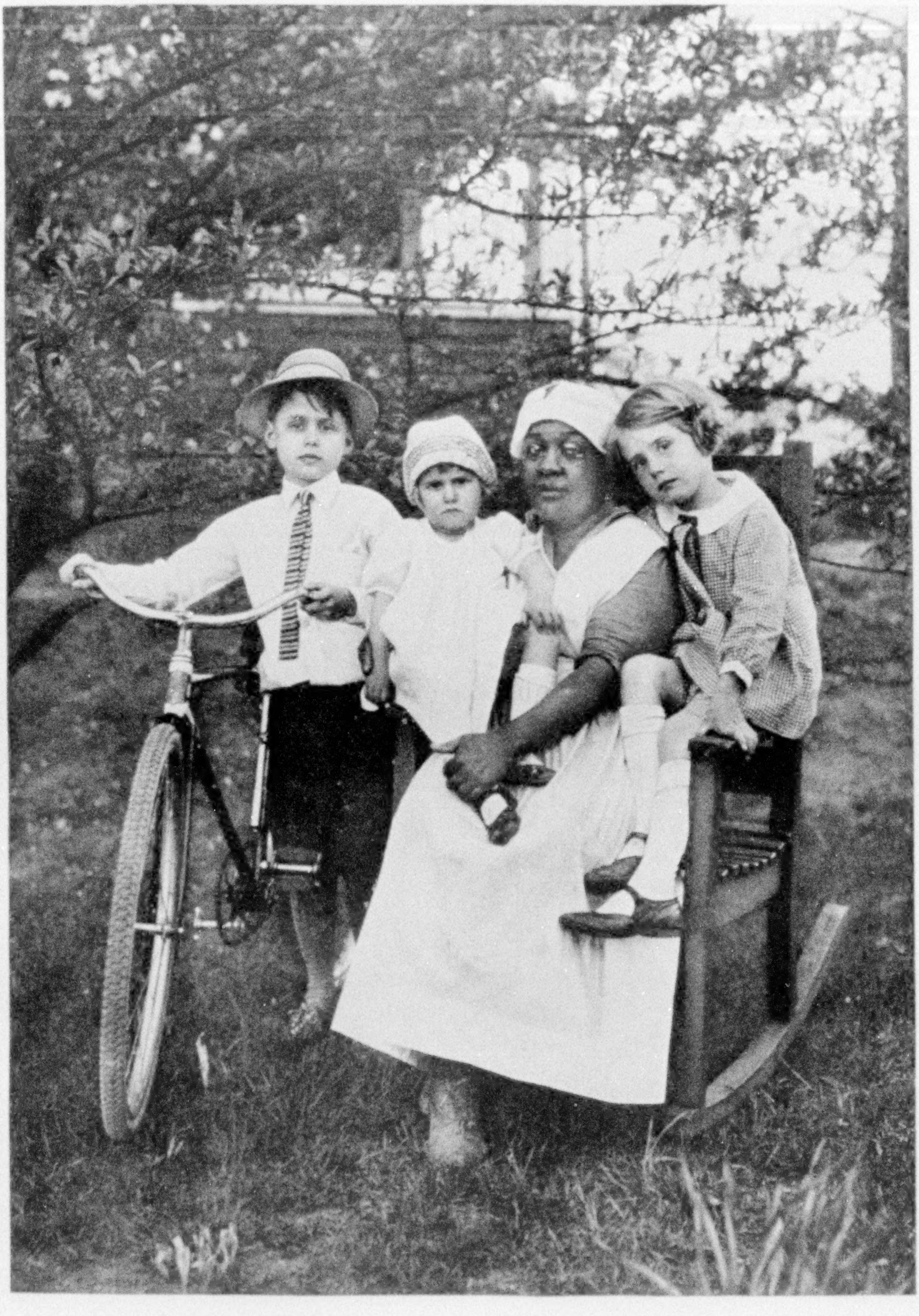
SLAVE QUARTERS OF THE OLD HERMITAGE PLANTATION NEAR SAVANNAH

Since ante bellum days these one-family cabins have remained unchanged in the changing South, but the once proud mansion of the master of the estate has long since fallen into ruin.

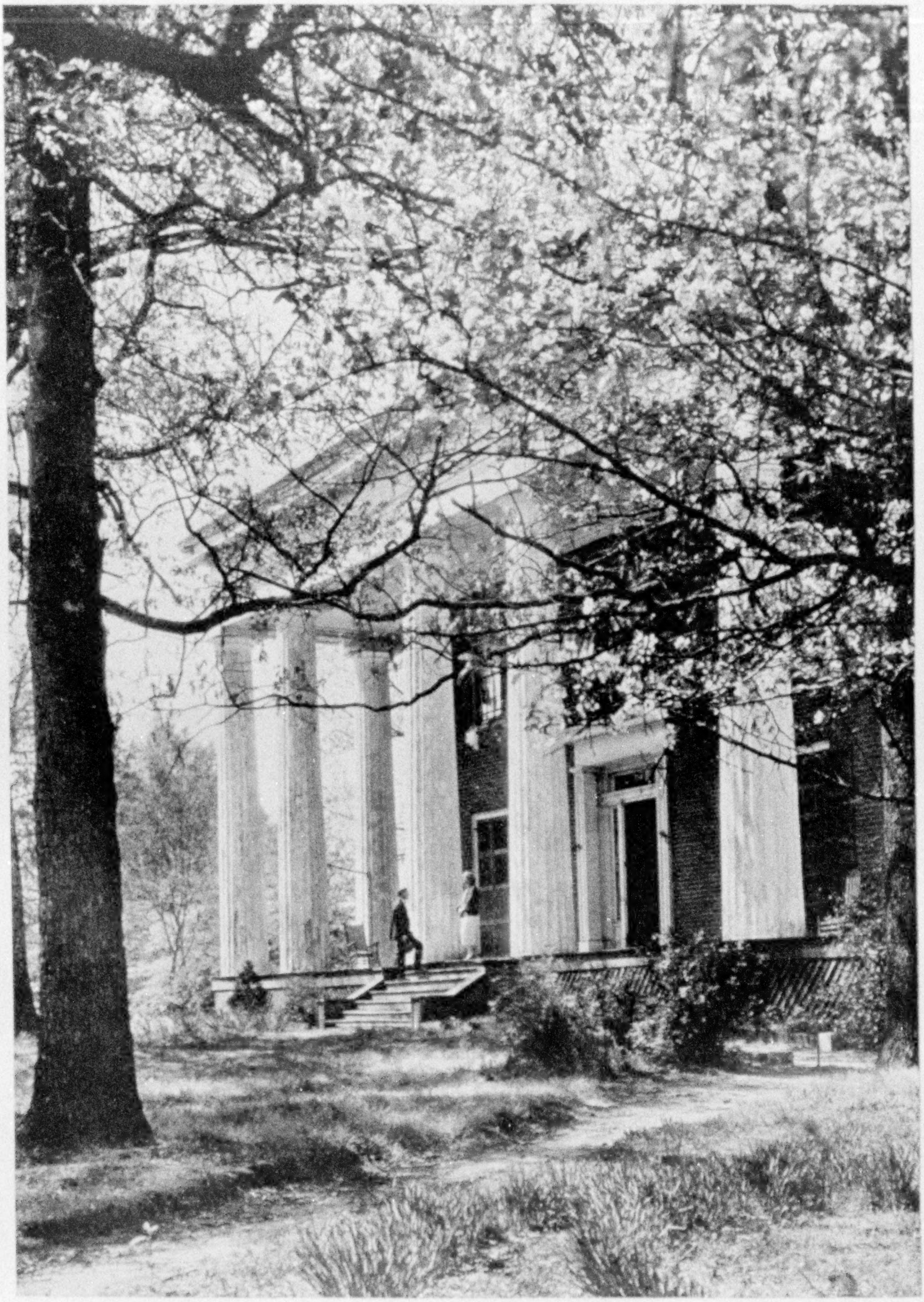


THE GOVERNMENT'S BAMBOO FARM NEAR SAVANNAH

This magnificent grove of canes has sprung from a single shoot of bamboo planted 35 years ago. From it the United States Department of Agriculture has shipped thousands of plants throughout the South and Southwest. Bamboo flourishes in the United States from Virginia to California (see text, page 295). Each plant in this grove attained its full height in a single season's growth. Some of the canes grew at the rate of from 12 to 17 inches in 24 hours.



"MAMMY LOU": THE TYPE WHICH HAS BEEN THE INSPIRATION FOR COUNTLESS POPULAR SONG WRITERS

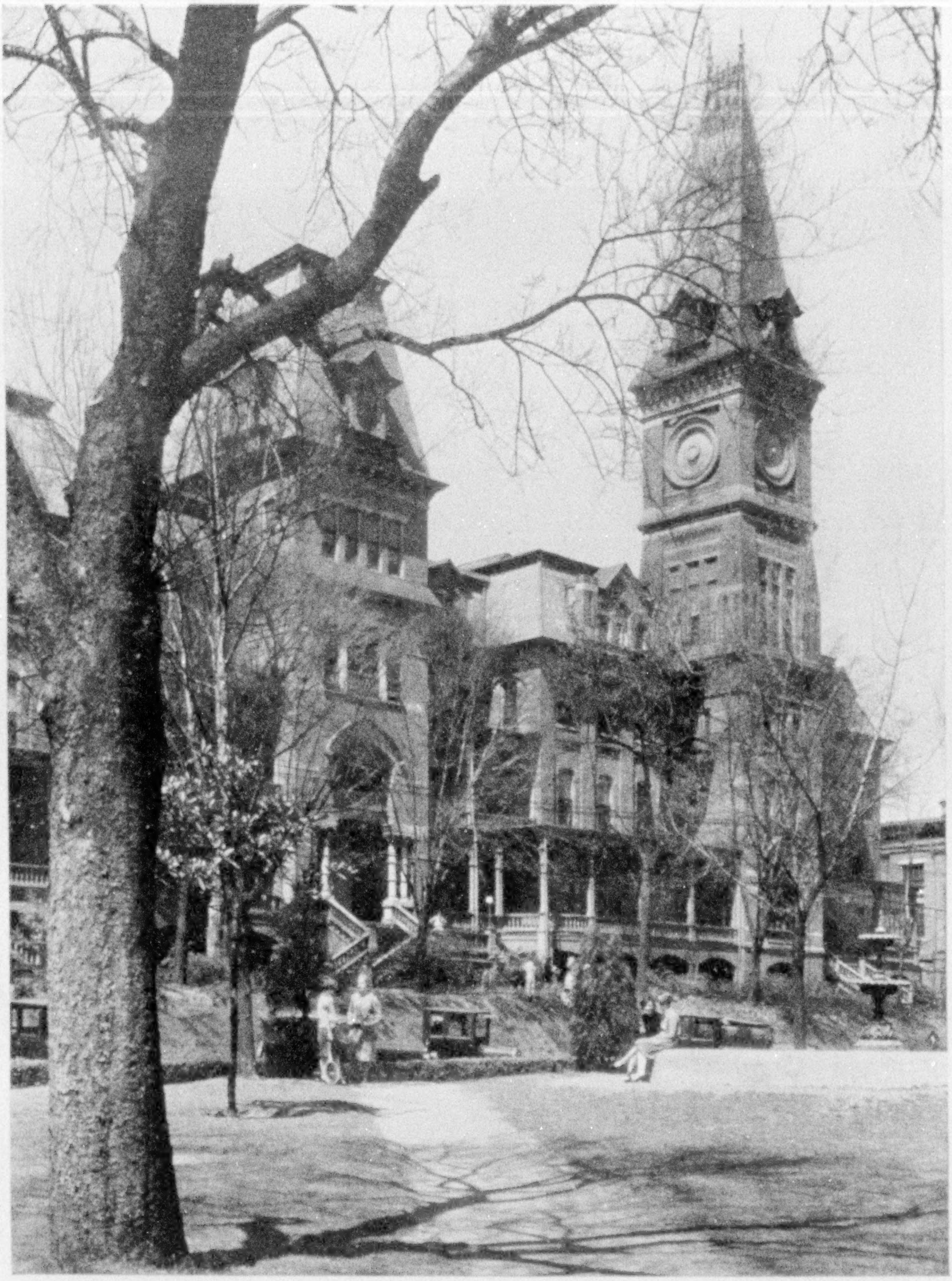


A PORTICOED ANTE BELLUM HOME IN A BOWER OF OAKS AND APPLE BLOSSOMS: ATHENS

APPLE-BLOSSOM TIME IN CORNELIA

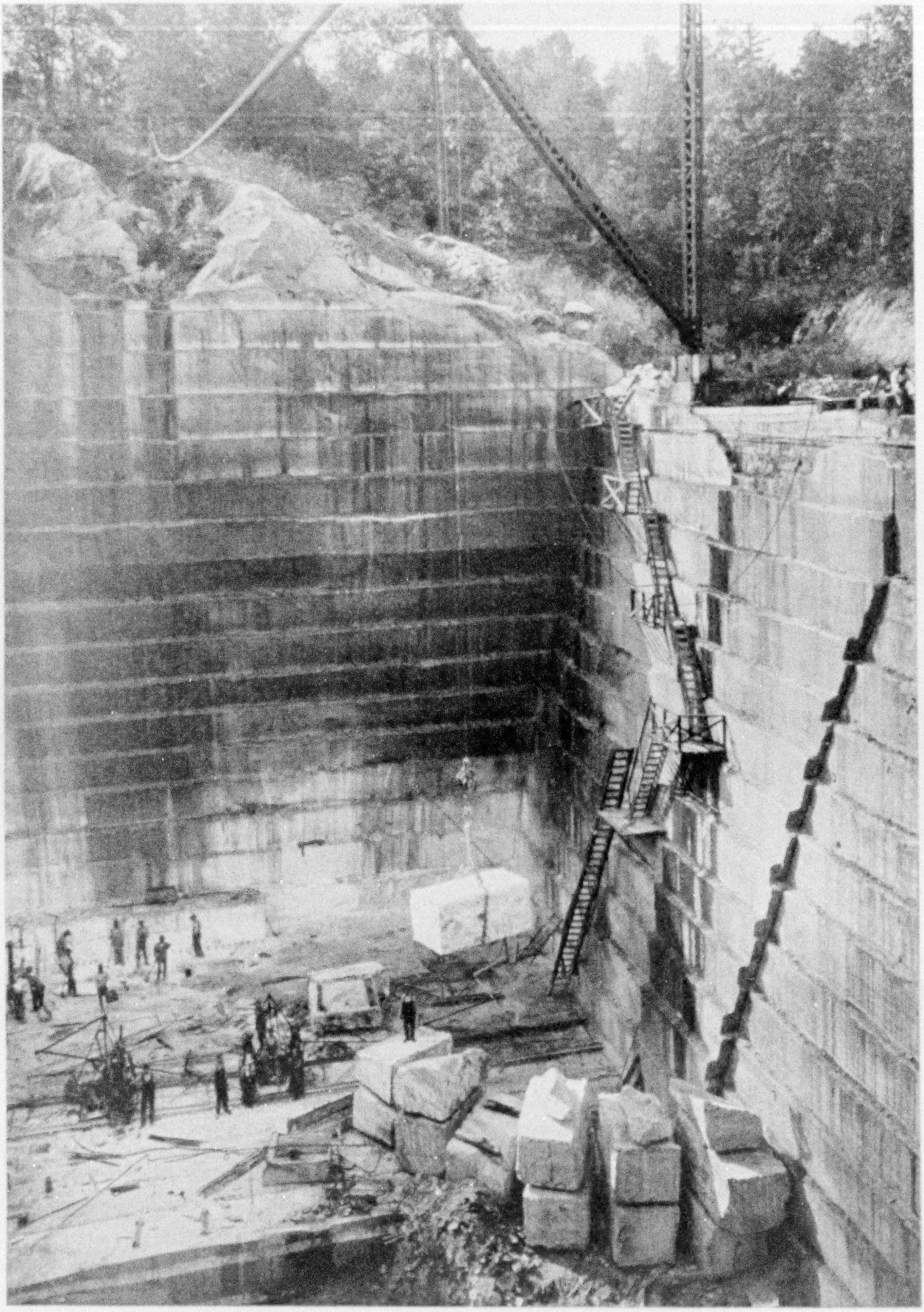
Compared with the raising of peaches and melons, apple-growing in Georgia is an infant industry, yet the State has nearly 1,500,000 trees of bearing age, and 300,000 of these are producing fruit in the region around Cornelia, in Habersham County. This county lives in the literature of Georgia through Sidney Lanier's "The Song of the Chattahoochee," the opening lines of which are:

"Out of the hills of Habersham,
Down the valleys of Hall."



A PIONEER IN HIGHER EDUCATION FOR WOMEN: WESLEYAN COLLEGE, MACON

Four noteworthy institutions in America claim a certain priority in the field of education for women. The Moravian Seminary and College for Women, in Bethlehem, Pennsylvania, has been engaged in educational work since 1742, but the institution was not incorporated until 1863. Oberlin (Ohio) College, a coeducational institution, was chartered in 1834; its first young women graduates (three) received their A. B. degrees in August, 1841. Wesleyan College, chartered in 1836, maintains that it is "the oldest chartered college in the world" exclusively for women. Its first degree was conferred in July, 1840. In South Hadley, Massachusetts, Mount Holyoke opened its doors as a seminary in 1837, having been chartered the year before; it received its charter as Mount Holyoke College in 1888.



RAISING A BLOCK OF MARBLE FROM A GEORGIA QUARRY

From one such 200-foot pit at Tate has come sufficient building material to reconstruct 40 New York Stock Exchange buildings (see, also, text, page 262).

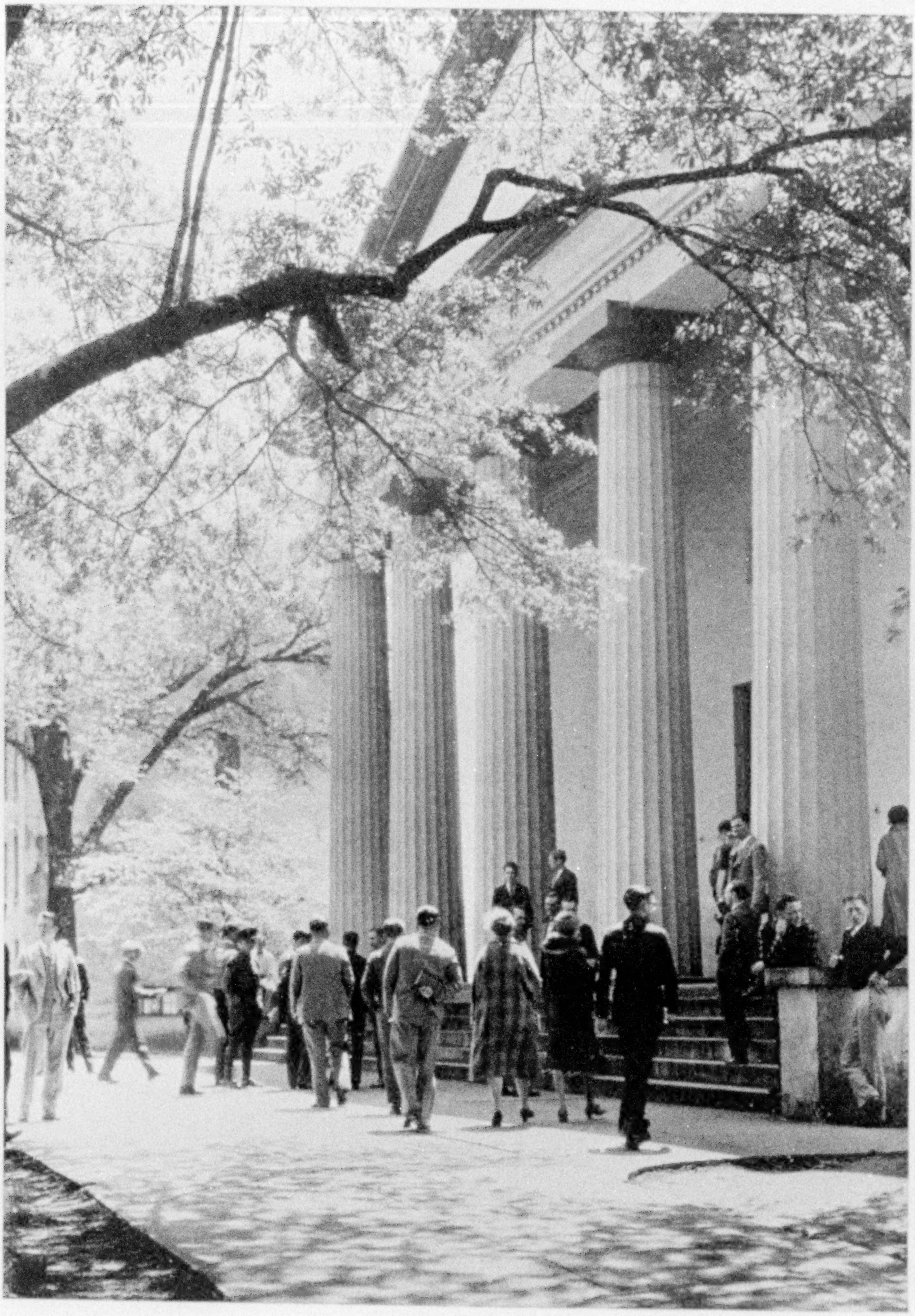
A HONEYSUCKLE THICKET NEAR THOMASVILLE

In the early spring the air in the woods of south Georgia is heavy with the perfume of the trumpetlike yellow jasmine and the wild azalea or honeysuckle.

Photograph by Earle Harrison

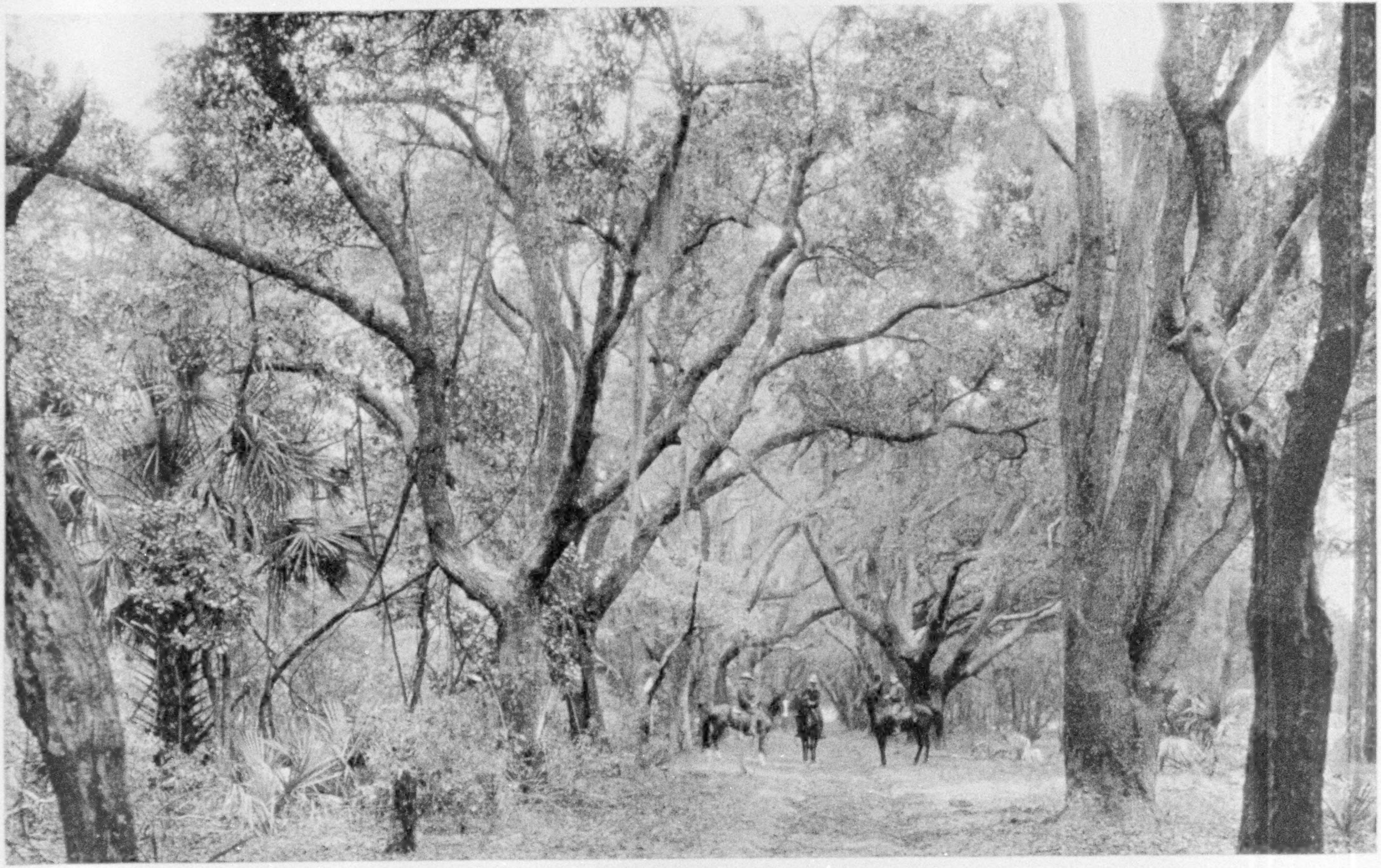
HIS HOME IS AMONG THE NORTH GEORGIA MOUNTAINS

For nearly a quarter of a century a school for mountain boys and girls, founded by Miss Martha Berry, of Rome, has been doing a pioneer work for the youth of northwest Georgia, providing sound education for its students and training them in agriculture and practical trades. The school, which had its beginning in a one-room log cabin, now is housed in 90 buildings and owns 6,000 acres. The land is being divided into model farms, upon which graduates of the school are settling.



CHAPEL HOUR AT THE UNIVERSITY OF GEORGIA

Athens is the seat of the oldest State university in the United States, as well as the home of the State Normal School and the State College of Agriculture. The finest building on the university campus is Memorial Hall, erected by the alumni in commemoration of their fellows who were killed in the World War. Its dedicatory inscription, written by the Chancellor Emeritus, reads: "In loyal love we set apart this house, a memorial to those lovers of peace who took arms, left home and dear ones, and gave life that all men might be free."



A VISTA THROUGH THE OAKS ON OSSABAW ISLAND

This old plantation road leads to an almost impenetrable swamp, in whose waters live hordes of slothful alligators, while in the overhanging trees is one of the largest egret rookeries of the South. Ossabaw Island, like several others off the Georgia coast, has been purchased recently as a private domain, and the owner is converting it into a game preserve for pheasants, as well as for wild turkeys, quail, and other native denizens of the Georgia woods.

to the group of business men, he announced with elation that the freeze had caused a damage of 40 per cent to the peach crop.

"This means prosperity for middle Georgia," he exclaimed. "A 10,000-carload crop should prove tremendously profitable to the growers, but another bumper crop like that of 1924 would have meant ruin." In that season the State shipped 14,000 cars of peaches, the eastern markets were glutted, and many a shipment to New York, Boston, and Philadelphia did not pay for its freight and refrigeration.

The time is coming when this condition will be remedied and the growers will long for the maximum amount of fruit which their trees can bear. The solution lies in the development of a canning industry to utilize the unmarketed fruit. There is also an almost inexhaustible demand for peaches that ripen too quickly to be crated and shipped, if they are preserved and shredded for use in the familiar soda fountain "sundae" so dear to the American palate.

Because of the crisis brought about by the bumper crop of 14,000 cars two summers ago, the "Georgia Belles," the last variety of peaches to ripen, were not even gathered from the trees, but were allowed to rot in the orchards.

ECONOMIC SLAVERY TO COTTON HAS LONG PERSISTED

In emphasizing the necessity for Georgia to develop methods of utilizing her surplus peaches, the publisher of Macon's morning newspaper, one of the most ably edited journals of the South, declared that slavery in the State still exists—an economic slavery through long dependence upon one crop, cotton.

For more than 100 years the Georgia farmer, the Georgia merchant, and the Georgia banker have thought and acted in terms of cotton. The whole financial structure of the State has been built around this crop. A man with a cotton field knows how to plant it, how to raise the crop, how to finance himself during the growing season, how to market his "bag," and how to get the money on it from his warehouse receipt. The banker likewise knows the cotton routine.

But when it came to other crops an entirely new machinery had to be developed, and that machinery in most communities is too new to run without "squeaking."

Lacking familiar facilities, many farmers of limited means and narrow experience have tried other crops, but they revert again and again to the time-tried cotton, with the result that, in spite of the fact that Georgia should be a self-contained State, so far as agricultural products are concerned, she annually imports approximately $175,000,000 worth of foodstuffs. For example, she buys hay in Wyoming and pays 120 per cent of its cost in freight charges, whereas her own rich hayfields along the banks of the Chattahoochee, in Seminole and Early Counties, as well as much of her other productive river bottom lands, lie fallow!

The Macon editor took me around the corner from his newspaper office and pointed to a grocer's window in which appeared two baskets of eggs bearing these labels: "Western eggs, 40¢ doz.," and "Eggs, 30¢ doz."

"Some day, that grocer will learn to wipe off those home-produced eggs, making them presentable, and he will then revise those signs, to read 'Fresh Georgia eggs, 40¢ doz.; Western eggs, 30¢ doz.' I am trying to hasten that day through the medium of my paper."

Though the fleecy fetters of King Cotton still gall the ankles of the Georgia farmer, there is no such one-product handicap in the industrial field. Everywhere one turns in the State there is a new industrial plant to be inspected.

GEORGIA BRICK AND GEORGIA PAPER

At Gordon, a few miles out of Macon, one of the most modern brick plants in America is utilizing the kaolin deposits previously mentioned (see page 270). The plant, which has been in operation for just a year, is designed in units, the first of which is now producing its 50,000 white bricks a day. The kaolin, sand and feldspar are mixed in mammoth containers and pressed out in a rectangular ribbon, which is borne along by a belt. A revolving wheel with wires for spokes slices it into bricks, as cakes of laundry soap are cut in a soap factory. At the same time each brick is pierced by three holes an inch in diameter, thus reducing its

A TOURNAMENT ON THE LINKS OF THE SAVANNAH GOLF CLUB

The bunkers on this course are converted Confederate breastworks. Whether or not Savannah can substantiate her claim that this is the oldest golf club in America, having been founded prior to 1789, there will be none to deny Georgia's claim to eminence as the home of two of America's most popular athletes—Bobby Jones, golf champion, and Ty Cobb, an idol of the baseball diamond for 20 years.

weight from 15 to 20 per cent and facilitating the drying process without decreasing its strength.

The soft bricks are now sent to a drier where a pound of water per brick is dried out in 24 hours, "waste" heat from the plant being utilized.

The bricks are next loaded on small cars, eight tons to the car, and are sent on their creeping journey of 72 hours through the kilns where they are subjected to oil-produced heat that begins at 200 degrees, gradually rises to 2,200, then as gradually drops back to 200.

In the same little town there is a mill which has a daily output of 60 tons of kraft paper, a tough, tear-resisting product used largely for wrapping packages exposed to rough handling, magazine wrappers, etc.

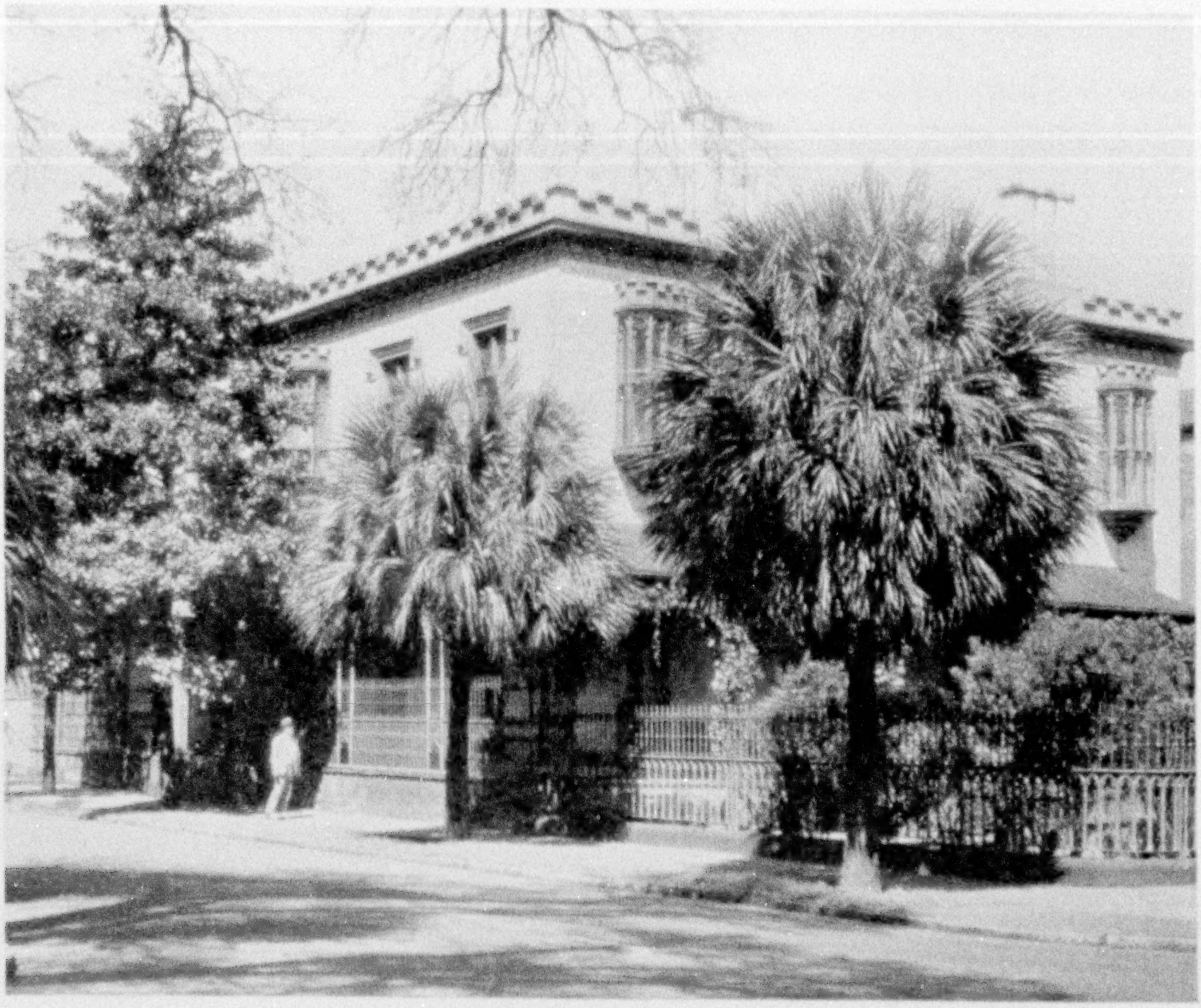
The wood-pulp supply from second-growth pine timber is apparently inexhaustible in this section of the State, for natural reforestation takes place in from 10 to 15 years, permitting a cut of one to two cords to the acre perpetually.

My next stop was Savannah, second city of the State. It was here that James Edward Oglethorpe, in 1733, established the first settlement of the new colony named for his sovereign, George II.

AT THE SCENE OF GEORGIA'S FIRST SETTLEMENT

There was a four-fold purpose actuating the founding of the last of the English colonies in America. The British Government was anxious to have a buffer state between the Carolina-Virginia settlements to the north and the hostile Spaniards in Florida, and a "shock absorber" for possible encroachments of the French from Louisiana. General Oglethorpe, on the other hand, was chiefly interested in affording a place of rehabilitation for thousands of his worthy but impoverished fellow countrymen and a retreat for the unfortunates of other lands who were being persecuted for their religious convictions.

The early settlers included not only Englishmen, but Scottish Highlanders,



WHERE THE MARCH TO THE SEA ENDED

This charming old Savannah residence, now occupied by one of Georgia's distinguished jurists, was the headquarters of General William Tecumseh Sherman, after his march through Georgia in 1864.

German Lutherans (Salzburgers), Portuguese Jews, Swiss, and Piedmontese.

How many woes might have been spared the State if the founders' original edict against the introduction of slavery and the importation of rum had been obeyed!

THE HOME PORT OF THE FIRST TRANS-ATLANTIC LINER

Like Augusta, Savannah is steeped in tradition, and historical association is the visitor's companion wherever he goes. Here he finds two monuments, the cornerstones of which were laid by Lafayette, one commemorating the Revolutionary hero, General Nathanael Greene, and the other that gallant Polish friend of liberty, Count Casimir Pulaski, who lost his life at the siege of the city in 1779.

Hard by is a third monument, to William Jasper, the hero whose daring exploit in replacing the fallen colors of the Revolutionary forces at Fort Moultrie in the face of a galling fire has thrilled every American schoolboy. Jasper fell at Savannah with Pulaski in the siege of '79.

It was from this flourishing seaport, 107 years ago, that the *Savannah* made the first successful transatlantic voyage in the history of steamship navigation, the passage to Liverpool requiring 25 days.

Three venerable structures in the heart of the Forest City, so named because of the massive, moss-festooned live oaks which line its streets, attract the attention of the historically minded—the Savannah Theater, one of the oldest playhouses in America, in which practically all the stage stars in the more than a century of its existence have appeared; Christ Church (see page 273), on the site of the original edifice where John Wesley, founder of

SAVANNAH'S PALM-BORDERED VICTORY DRIVE

This million-dollar highway connects the Forest City with its famous seashore resort, Tybee. It has been built as a memorial to Georgia's sons who fell in the World War.

Methodism, was once a rector and where he is supposed to have established a Sunday school (still in existence) some 50 years before Robert Raikes started his "first Sunday school in the world" at Gloucester, England; and the third a mellow old house, now the home of a venerable Savannah jurist, in which General Sherman established his headquarters after he had completed his "march to the sea" (see page 293).

HOW OUR SUGAR IS REFINED

While Savannah derives much of its delightful atmosphere from such associations, there is another side to the city which is equally arresting. It is the world's greatest naval stores market and its miles of waterfront accommodate shipping from all parts of the globe, especially vessels which come for cargoes of cotton, turpentine, and rosin.

There is also a manufacturing side to this, the oldest city in the State. One of the most interesting of its industrial establishments is a sugar refinery, the only plant of its kind between New Orleans and Baltimore, and therefore occupying a marketing advantage in an area covering 13 States.

The raw sugar comes in shiploads direct from the cane mills of Cuba* to the docks of the refinery, where each 325-pound bag is tested for its sucrose, or sweetness, content by three inspectors—one who represents the United States Government and determines the amount of duty to be paid, another the sugar planter in Cuba, and a third the refinery.

The cargo comes sacked in burlap, and to the amazement of the stranger, there are no "Use no hooks" signs. Jagged holes are snagged in almost every bag as it is lifted from the hold of the vessel and the long, augurlike instruments of the testers make other punctures. But the unrefined brown sugar is damp and little of it spills. That which does seep out is not lost but is swept up and shoveled into the hopper with all the rest, coming out eventually entirely cleansed and almost as nearly chemically pure as any article in man's dietary.

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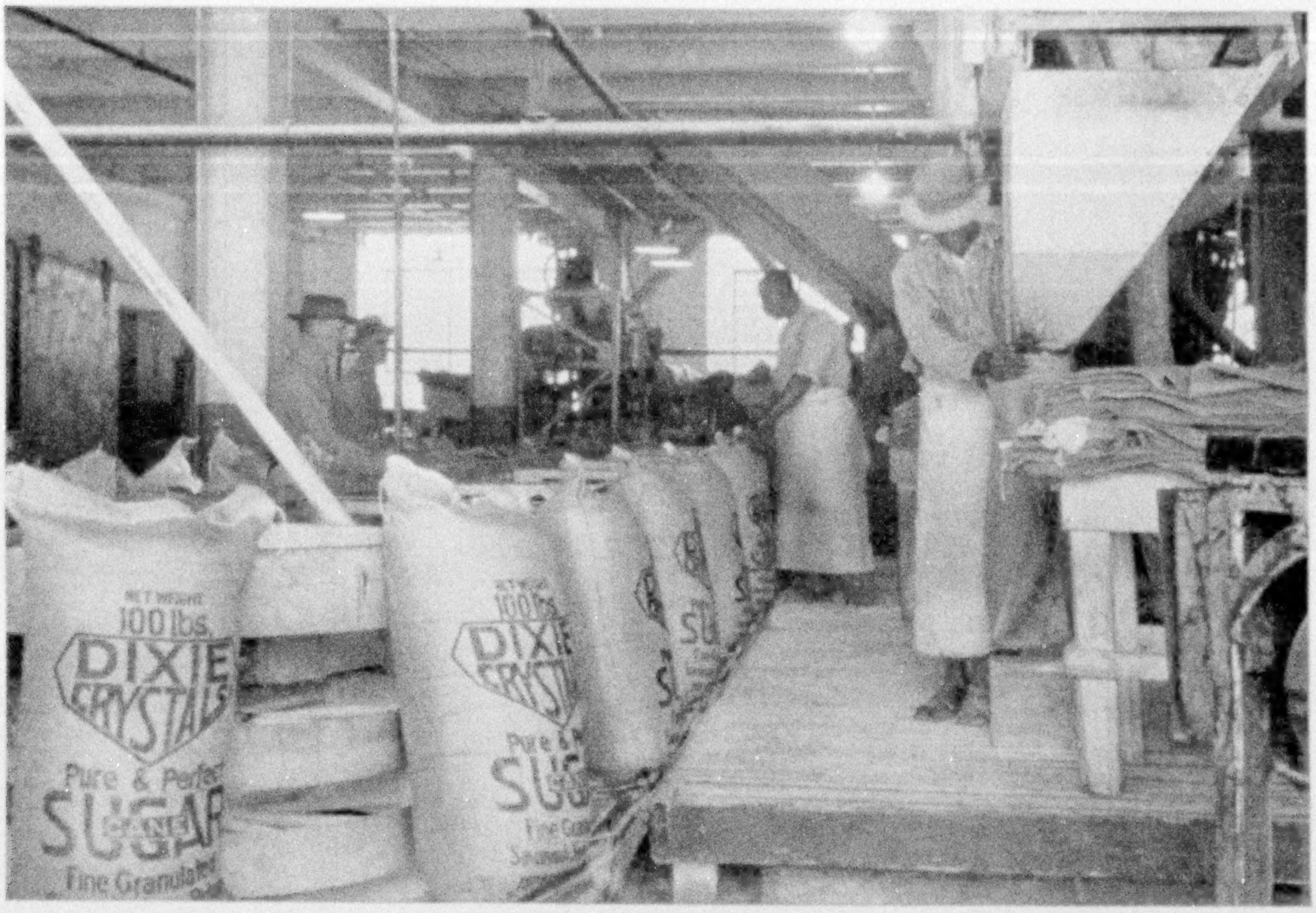
* See "Cuba, the Sugar Mill of the Antilles," by William Joseph Showalter, in the NATIONAL GEOGRAPHIC MAGAZINE for July, 1920.



WEIGHING AND SACKING SUGAR BY MACHINERY

From the time the raw sugar is dumped into the hopper until it leaves the refinery, it is not touched by the hand of any one of the 400 employees at the Savannah refinery.

While a modern sugar refinery, including its storage warehouses with tens of thousands of sacks of raw sugar piled 30 to 40 feet high, is a mammoth affair, the actual process of refining is effected on comparatively simple principles.

The raw sugar is first freed of surplus moisture in centrifugal cylinders, then it is reduced to a syrup which is filtered through big tanks, each containing 30 tons or more of bone black which removes the yellowish color. Formerly dried ox blood was used as the filtering substance. The liquid is next boiled in semivacuum containers to prevent scorching. When crystals begin to form in the rich syrup, the thinner syrups are drawn off for further treatment. Sometimes a syrup may be sent through the crystallizing process as many as 90 times, in order to extract every available crystal.

The sugar is washed, then dried in hot-air blowers and is ready to be automatically weighed and poured into containers—in cartons, in 2-, 5-, 10-, 25-, 50-, and 100-pound sacks and in barrels, at the rate of 2,000,000 pounds a day.

From the time the raw sugar is dumped into the hopper until it is delivered to the consumer it has not come in contact with the hands of any one of the 400 employees of this plant (see illustration above).

As an interesting sidelight upon the efficiency with which such a refinery is organized, it is learned that the cost of labor in refining the 2-pound carton or the 5-pound bag of sugar which you buy from your grocer was less than the cost of the pasteboard box or the muslin bag itself and its outer wrapper!

WHERE BAMBOO GROWS MORE THAN A FOOT A DAY

Twelve miles out of Savannah, on the superb highway which is soon to be completed through Chatham, Bryan, Liberty, McIntosh and Glynn Counties to Brunswick, Georgia's second seaport, one passes a unique experiment station operated by the Department of Agriculture. Here a bamboo propagating farm, which started from a single shoot 35 years ago, is flourishing (see illustration, page 281).

Many thousands of plants have been shipped from this station since 1920,

AN ARTESIAN WELL ON SAPELO ISLAND

and within two years it is expected that 25,000 plants can be distributed annually throughout the region from Virginia south and west to California.

The most startling peculiarity about the bamboo is that the cane or culm attains its full size and height in a single season of six or seven weeks' growth—in May and June. Some of the canes reach a height of 50 or 60 feet, with a diameter of several inches, and the station has a record growth of 17½ inches in one day!

The United States annually imports large quantities of split bamboo and bamboo poles for flower stakes, bean poles, and fishing rods. The Government is maintaining the Georgia station in the belief that our domestic requirements can be supplied by bamboo groves planted in our Southern States, and a careful study of various economic species of bamboo is now being made to determine adaptability to soils and climate.

Preliminary experiments indicate that it is possible to grow as fine bamboo in the United States as is commonly grown in the Orient.

SPANISH MISSIONS IN GEORGIA LONG BEFORE ENGLISH SETTLED IN AMERICA

This whole Georgia coast from Savannah to Brunswick, and on down to St. Marys, including the fringe of semitropical islands off the mainland, was once debatable land, lying between the Spanish settlements in Florida and the English settlements in Virginia and the Carolinas.

Long before the English gained a foothold in the New World, however, the Jesuits and the Franciscans had established numerous missions in this region, then called Guale. Spanish chronicles recently brought to light show that a year before the first permanent English settlement at Jamestown the bishop of Cuba made a pastoral visit to four Georgia missions to confirm 1,070 neophytes.

When Oglethorpe won the Battle of Bloody Marsh on St. Simon Island, opposite Brunswick, in the summer of 1742, it proved to be the decisive conflict of a struggle that had lasted nearly a century and a half, and it determined the destiny of Georgia as an English colony.

The ruins of Frederica, Oglethorpe's fort and base of operations, still stand on St. Simon and a few yards away are the moss-covered trees which are identified as the Wesley oaks, beneath which John preached and Charles sang nearly 200 years ago.

The Wesleys and their noted fellow worker, Whitefield, played major rôles in the early history of Georgia, although Charles remained in the colony only six months and John only two years. The latter's experiences in Savannah and Frederica were to affect his whole career and life's work.

The broad, palm-bordered boulevard which runs across Bloody Marsh to-day and connects St. Simon with Brunswick on the mainland has given this island, with its contiguous Long Island, a wonderful impetus as a summer resort, while back from the ocean front truck gardeners are performing prodigies with lettuce, cucumbers, tomatoes, and beans as well as with poultry.

Across Brunswick's harbor entrance from St. Simon lies Jekyl Island, forerunner of Miami and Palm Beach. A group of multimillionaires, attracted by the salubrious climate and the opportunities for the creation of a superb hunting and fishing preserve, bought the island 40 years ago and established the Jekyl Island Club, consisting of a group of luxurious rustic winter homes.

A CHAMPION WHITE LEGHORN OF GLYNN COUNTY

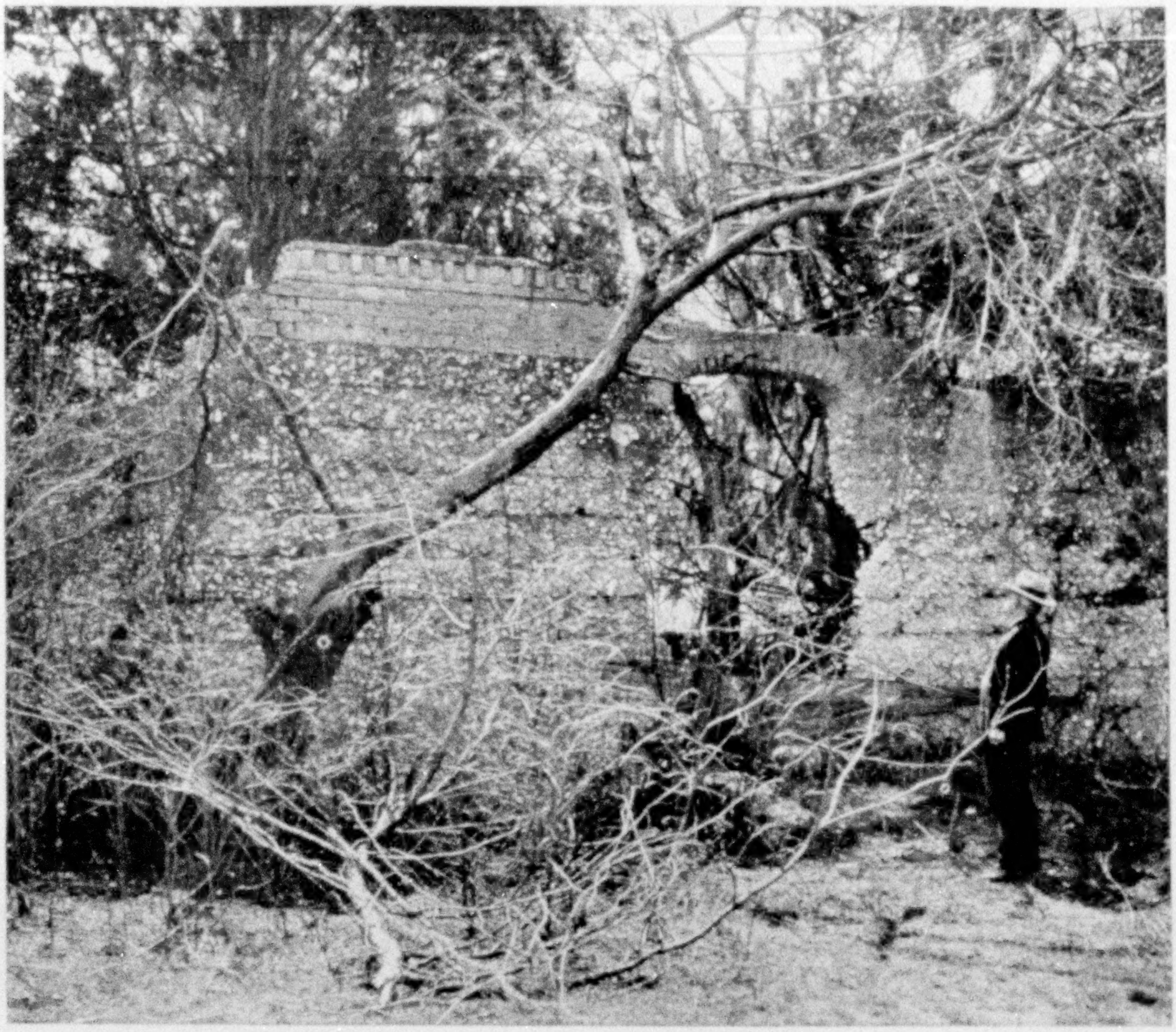
"Liza Jane," known officially as No. 53 in her owner's flock, has a record of 312 eggs in one year. She is quite a personage in her sphere and receives post cards from poultry raisers of many States. The annual value of Georgia's poultry products has increased from $5,000,000 ten years ago to $30,000,000 to-day.

BRUNSWICK COMES INTO HER OWN

Brunswick has had more discouragements, perhaps, than any other important city in Georgia. She has had her railroad and steamship disappointments, she has had her severe postwar deflation, and she has often received only the "left-overs" from the Congressional Rivers and Harbors "pork barrel" bills. But a small group of her citizens has maintained a dauntless optimism in the face of every setback, and the tide seems to have turned at last.

With an excellent system of paved roads throughout Glynn County and with a rapidly developing truck-farming industry, especially on St. Simon, her present prosperity is basically sound.

Industrially the city has a variety of interests, including a $7,000,000 oil refining plant, a fishing fleet of 200 vessels, many of which are employed in supplying a big shrimp-canning factory; creosoting works and a marine railway, but her unique manufacturing establishment is a steam distillation turpentine plant, the largest of its kind in the world, extracting turpentine and rosin from stumps (see page 299).



"THE THICKET," NEAR DARIEN

Note the flat arch, a peculiarity of Spanish colonial construction, and the "tabby" wall, composed of oyster shell and sand. Long before the English established their first permanent settlement on the American Continent, the Spaniards were endeavoring to Christianize the Indians along the Georgia coast, then known as Guale (see text, page 296).

The story goes that after the Armistice one of the big munitions plants was seeking a field for investment and its attention was accidentally attracted to a concern in Brunswick which had been using a considerable quantity of blasting powder. Investigation resulted in acquisition and subsequent enlargement of the steam distillation turpentine plant, which blasts its raw material out of fields and cut-over timberland, a brain flash that developed an economic return of thousands a year.

A MAMMOTH STUMP FACTORY

Stumps are hauled into Brunswick from distances ranging between 40 and 120 miles, at the rate of 600 tons a day. In some parts of Georgia farmers are paying from $15 to $20 an acre to have their fields cleared, but in Glynn and neighboring counties the canny landowner exacts a price for his stumps, the bugaboos of the plowman, much after the fashion in which Tom Sawyer charged his young friends for the privilege of whitewashing his Aunt Polly's fence.

The stumps are blown out of the ground with powder, which is inserted in a hole bored deep into the roots by pneumatic augurs. Only those stumps which have been dead for eight or ten years are used, but the Georgia supply of these, so far as this one plant is concerned, is said to be inexhaustible.

Gigantic "hogs" crush and grind the stumps to match-stick size, and the wood is then dumped into great tanks holding from 17 to 18 tons of splinters, called a

TURPENTINE AND ROSIN ARE TO BE UNLOCKED FROM THESE DEAD STUMPS

One might paraphrase an old adage and speak of these stumps as "good riddance to rich rubbish," for their removal by explosives from the farmer's fields is an aid to agriculture, while by steam distillation in the largest plant of its kind in the world, at Brunswick, they are made to produce seven gallons of spirits of turpentine and nearly a barrel of rosin to the ton.

charge. For 20 hours the charge is cooked with steam at 400 degrees. The turpentine vaporizes and is condensed in a separate container. The chips are then washed with boiling gasoline, which absorbs the rosin. The gasoline is next cooked out, leaving the rosin.

So carefully has the machinery of condensation been developed that less than a fourth of one per cent of the gasoline is lost in the process.

After being thoroughly dried to prevent explosion, the chips are used as the plant's fuel.

A ton of stumps will produce seven gallons of turpentine and an average of four-fifths of a barrel of rosin. A third product derived from this process is pine oil, used extensively in medicine and in the reduction of copper ore.

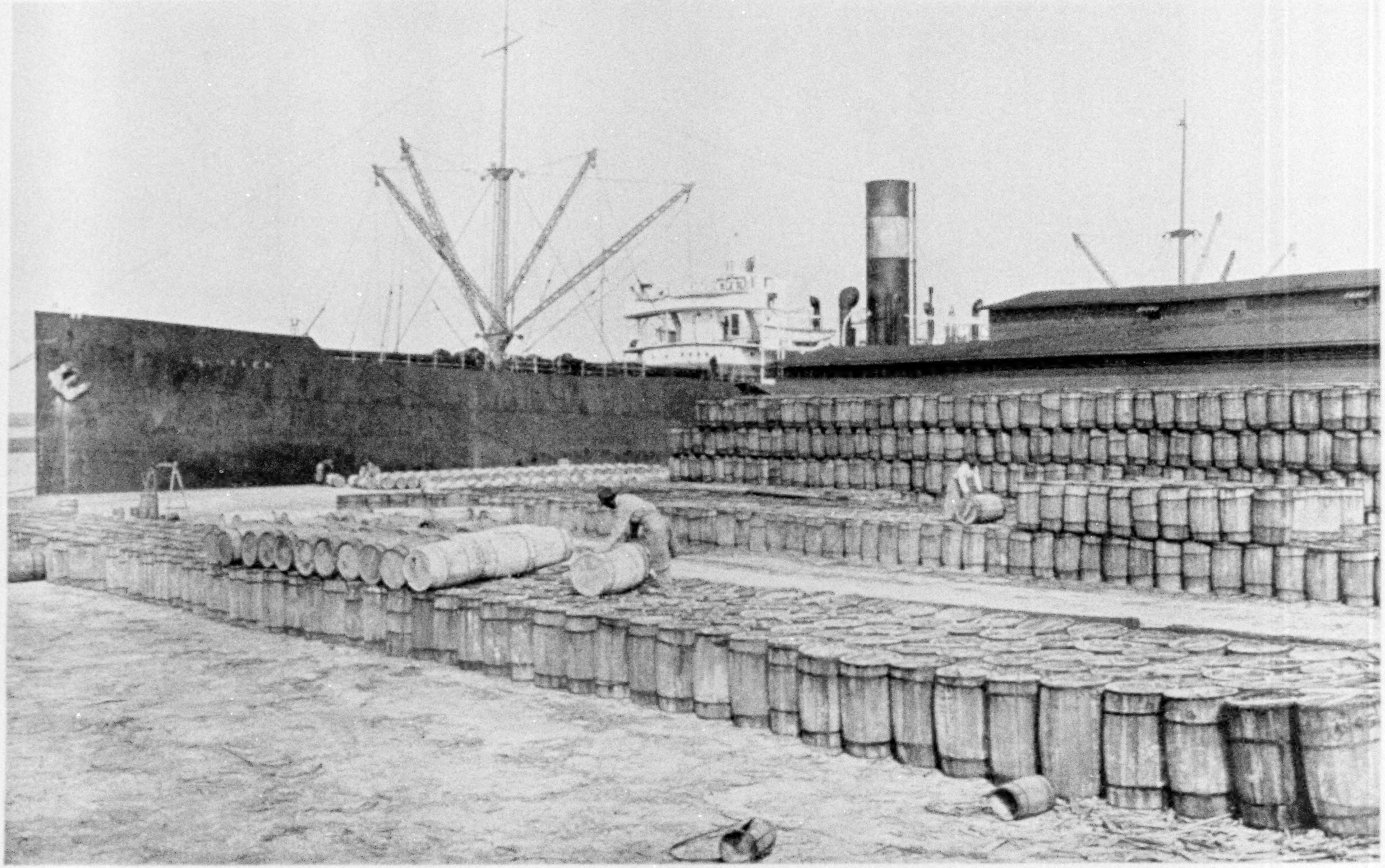
GEORGIA IS ONCE MORE THE LEADING NAVAL STORES STATE

Having watched this plant in operation, I was anxious to renew my acquaintance with the old-fashioned way of producing the finer grades of turpentine and rosin from the gum.

About the beginning of the century many of the Georgia turpentine operators abandoned their stills and moved on to Alabama, Mississippi, and Louisiana, declaring that practically all of Georgia's available turpentine timber had been worked. But when I revisited Decatur County I found that men who two decades ago had declined to "pull up stakes" and join the exodus toward the west were still operating, and in many cases on the same timberlands.

PRODUCING TURPENTINE FROM RAW GUM

Improved methods, and an intelligent conservation policy, including protection of reforested areas against the fire hazard, have not only enabled these operators to continue in business, but there is every prospect that by pursuing their present policies, turpentining in this section will prove a permanent industry. For the last three years Georgia has again led the Union in the production of naval stores.



ROSIN PRODUCED FROM DEAD STUMPS BEING LOADED AT BRUNSWICK FOR GLASGOW

Let us go into the woods and follow the production of turpentine and rosin from the tree to the barrel.

A woods rider, or superintendent, selects his "stand" of timber, which includes trees of from 20 to 30 years of age, preferably the latter, and with a crew of 15 men, works from January to March installing a small galvanized iron cup with side gutters at the base of each tree (see page 302).

Early in April the men start their rounds, scarring each tree just above the cup. The instrument used is a "hack" and the scarring, or "chipping," requires but two strokes to make a wide V incision in the bark.

Once a week, for from 28 to 32 weeks, the chipper makes two new incisions in the bark, each higher than that of the previous week, until by the end of October there is a white blaze on the side of the tree 10 to 12 inches wide and 24 inches high. Succeeding seasons may extend the blaze to a height of six or eight feet.

A hacker can chip from 8,000 to 12,000 "boxes" a week, 10,000, known as a "crop," being a fair average, and for this labor he receives $1.50 per thousand.

Every fourth week another crew makes the rounds, gathering the raw gum from the cups. These gatherers, or dippers, are paid on the same scale as the chippers.

Ten barrels of the raw gum, constituting a "charge," are emptied into a copper still, in which it is cooked for two hours, at the end of which time about two barrels of spirits of turpentine have been distilled and four barrels of rosin remain in the bottom of the copper pot.

A sluice door is opened and the boiling rosin gushes out into immense sieves, over the coarse wire of which cotton batting has been spread. Through this the rosin strains into troughs and while still viscous is ladled into barrels by means of long-handled buckets. The used batting, which is impregnated with rosin, is sold to lampblack factories as a by-product. Locally it is extensively used for kindling, as it makes a highly concentrated, readily inflammable fuel, emitting a heavy black smoke.

Thirty years ago all pine trees were "boxed" with a deep wedge cut into the base of the tree to catch the gum. This practice not only made the work of the dippers more difficult, but it increased the fire hazard tremendously and, finally, in many instances the wedge materially weakened the smaller trees, so that windstorms destroyed vast areas.

It was a professor of chemistry at the University of Georgia who invented a cup method of turpentining, thus saving millions of dollars for the industry.

Turpentining does not affect the quality of lumber which a tree will produce, but in the old, haphazard days the forests were seriously damaged by the careless methods of the operator who often destroyed a stand of timber by working trees which were too young and too small to undergo boxing. The number of years during which a tree can be worked for turpentine depends largely upon its size when first chipped. Its life after it has been intelligently turpentined is not appreciably shortened.

TRANSPLANTING OF NURSERY PINE TREES IS IMPRACTICABLE

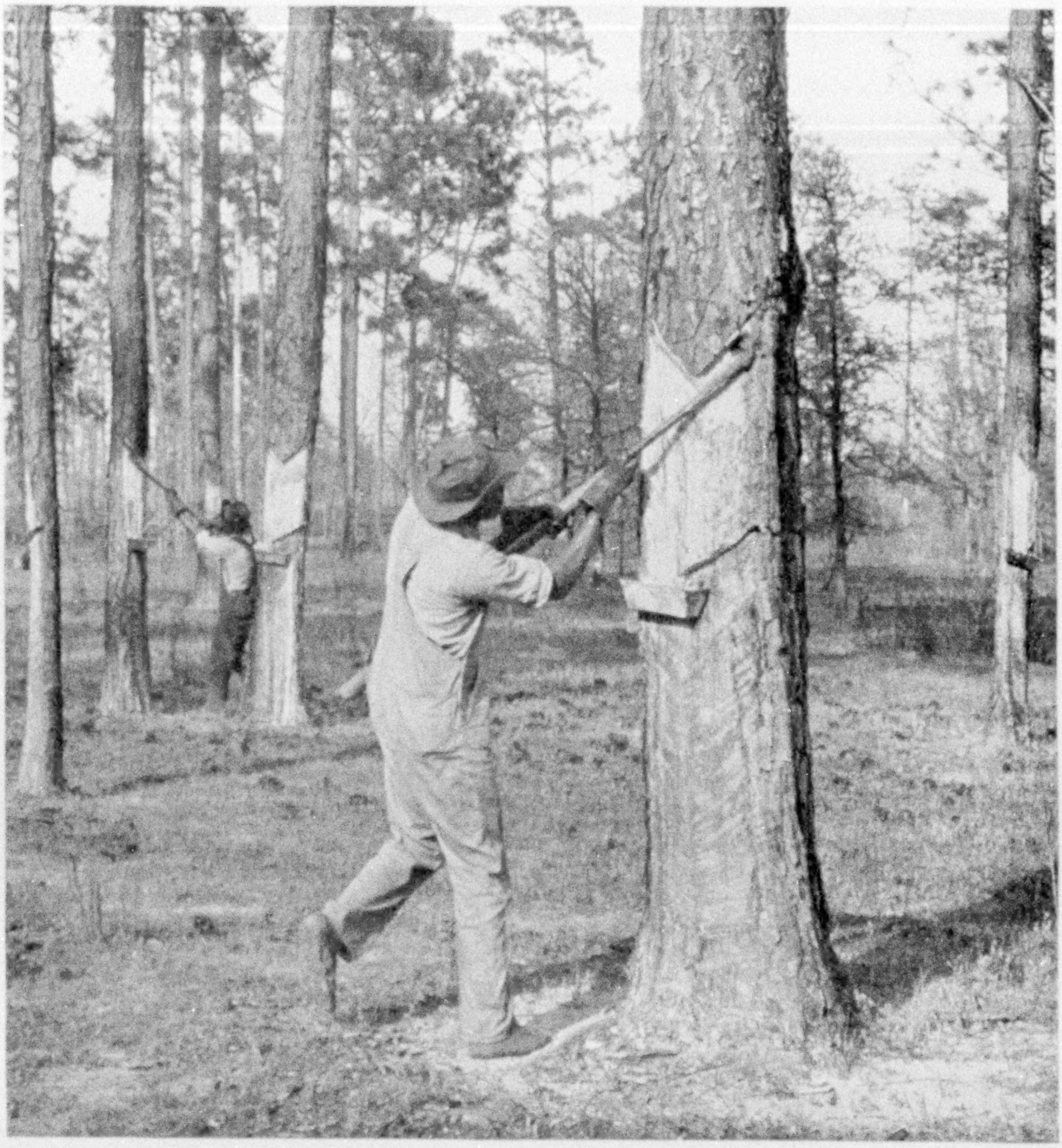
In reforestation it is impracticable to plant "nursery" pine trees, for the reason that the roots of even the youngest seedlings run too deep to be transplanted economically. The landowners therefore rely upon natural processes or else plant the pine mast (seed).

"The Lord probably foresaw that we weren't going to have sense enough to take care of the pine forests which He gave us," remarked one veteran turpentine man, "so He devised the pine mast, a seed with a sail attached to it, enabling it to fly far and wide in order to perpetuate our forests."

Land on which there are as few as 50 trees to the acre can be worked with profit, but one farsighted lumber company is seeding 400 to the acre as most economical for operation.

Many operators burn over their turpentine lands in January and February, to kill the snakes and destroy the undergrowth, which might prove serious in case of a fire in dry September or October. This practice is frowned upon by Government forestry experts, however; wide fire lanes are deemed a far more effective means of prevention.

All the world is interested in the conservation of the South's pine timber, for



SCARRING PINE TREES FOR TURPENTINE

Note the galvanized iron gutters which carry the exuding gum into the cups. As the scarification proceeds the cup is moved up the trunk. Contrary to the general impression, turpentine gum is not the sap of the pine tree, but is an exudation by means of which Nature tries to heal the wound made in the bark.

turpentine is an essential ingredient in paints, varnishes, and in the pharmacopœia, while rosin is used in paints, in soap-making, shipbuilding, in the manufacture of high-grade paper, and in all soldering operations.

THE OKEFENOKEE SWAMP A REGION OF POTENTIAL WEALTH

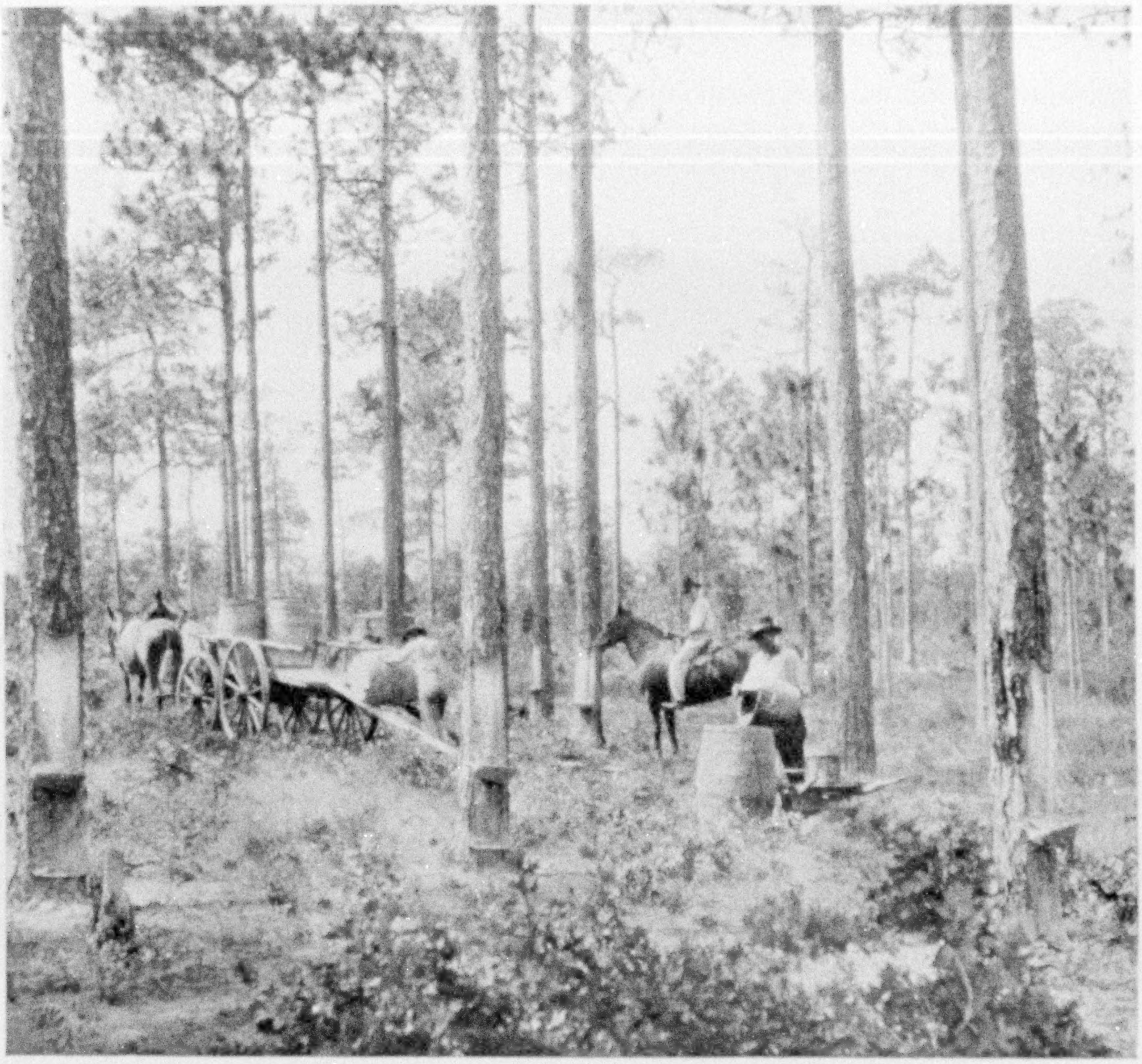
The turpentine operators are not only managing to maintain their production in southwest Georgia, but are finding it practicable to move back into counties which were worked 20 or 25 years ago and where natural reforestation has taken place.

Slash pine (probably the finest variety of turpentine timber) reproduces with extraordinary rapidity in the vicinity of the Okefenokee Swamp. An annual growth of three feet in height for young pines is not unusual.

The Okefenokee, incidentally, is one of the most picturesque regions of the

VIRGIN PINE TIMBER IN SOUTHWEST GEORGIA

While there remain few extensive stands of virgin timber in the State, the second-growth pine is now being profitably worked for turpentine. Twenty years ago there was an exodus of turpentine operators from Georgia to Alabama, Mississippi, and Louisiana, but many are gradually returning, and for the last three years Georgia has led every other State in the South in the production of naval stores (see text, page 299).



Photograph courtesy U. S. Forest Service

GATHERING TURPENTINE GUM IN A PINE FOREST

The height of the blazed surface of these pine trees indicates that they have been chipped for two seasons or more. When the tree has been scarred as high as it can be conveniently worked, a "box" will be cut on the opposite side if the trunk is sufficiently large. Some giant pines can produce gum in succession from three, or even four, blazed surfaces over a period of years. The gum is taken from the galvanized cups, poured into barrels, and hauled to a near-by turpentine still (see text, page 301).

entire South. Its 800 square miles in the southeastern corner of the State (see map supplement) comprise one of Nature's zöological and botanical gardens.

A REGION OF ROMANCE, WHERE THE SUWANNEE RIVER RISES

On the islands which dot its cypress-tinted waters is a wealth of flowers canopied by forests of gum, bay, pine, and cypress, while in the grassy savannas and on the banks of placid streams the amphibious alligator is sought by the sportsman, who also finds bear, deer and a vast variety of fishes in abundance.

The Okefenokee conjures to mind many incidents of romance and adventure. Here the warlike Seminole Indians made their last stand against the whites, and here deserters from the Confederate forces during the Civil War found safe hiding in its fastnesses. Some of the descendants of the latter still occupy primitive huts on its sequestered islands.

The St. Marys River takes its rise in the swamp, flowing eastward into the Atlantic and forming part of the boundary between Georgia and Florida. Here, too, are the headwaters of the stream flowing into the Gulf, which furnished the inspiration for Stephen Foster's immortal "Suwannee River."

We return to the southwest corner of the State for a hurried visit to the fuller's earth mines and the tobacco lands of Decatur County.

As we motor southward from Bainbridge, the county seat, toward the Attapulgus clay beds, the well-graded highway runs between extensive groves of pecans, reminding us that Albany, in the neighboring county of Dougherty, is the center of one of the most prosperous nut-raising regions of America. In fact, the pecan industry has grown to such proportions that Albany each year has its pecan pageant comparable to Fort Valley's peach blossom festival (see page 271). Two-thirds of America's cultivated pecans are produced in Georgia.

ATTAPULGUS HAS HAD ITS FEVERISH PROSPECTOR DAYS

Attapulgus, situated almost on the Florida line, a few years ago became the center of a "rush" which, on a small scale, recalled the days of '49 in California. Everybody was prospecting and the woods were full of mysterious strangers eagerly acquiring subsoil rights.

Soon land prices soared to unbelievable figures and farms which had never produced crops worth as much as $50 to the acre were bringing hundreds and even thousands of dollars. All because it had been discovered that a stratum of some of the finest fuller's earth in the world underlay this district and every oil-refining company in the country wanted its share.

Finally, one firm agreed to supply all the refineries at a reasonable price. The bottom dropped out of the clay boom, but the fuller's earth industry had come to stay.

The Attapulgus plant mines the fuller's earth and prepares from 250 to 275 carloads of 25 tons each per month, to be used as a filter for lubricating oils. Each refining company requires a distinctive grade of earth, some coarse-grained, others pulverized or of shalelike quality.

The number of steam shovels and trains of cars engaged in removing the topsoil, or overburden, which in some places extends to a depth of 45 feet, suggests that another Panama Canal is being dug. The clay is found in a stratum about six feet deep and comes from the mine damp (see page 306). It has first to be dried in enormous revolving cylinders heated by oil flames injected under great pressure. The clay adheres to the sides, becomes incandescent, and thus converts the interior of the cylinders into the semblance of caves hung with lovely glowing stalactites.

DECATUR COUNTY PRODUCT AIDS EVERY AMERICAN MOTORIST

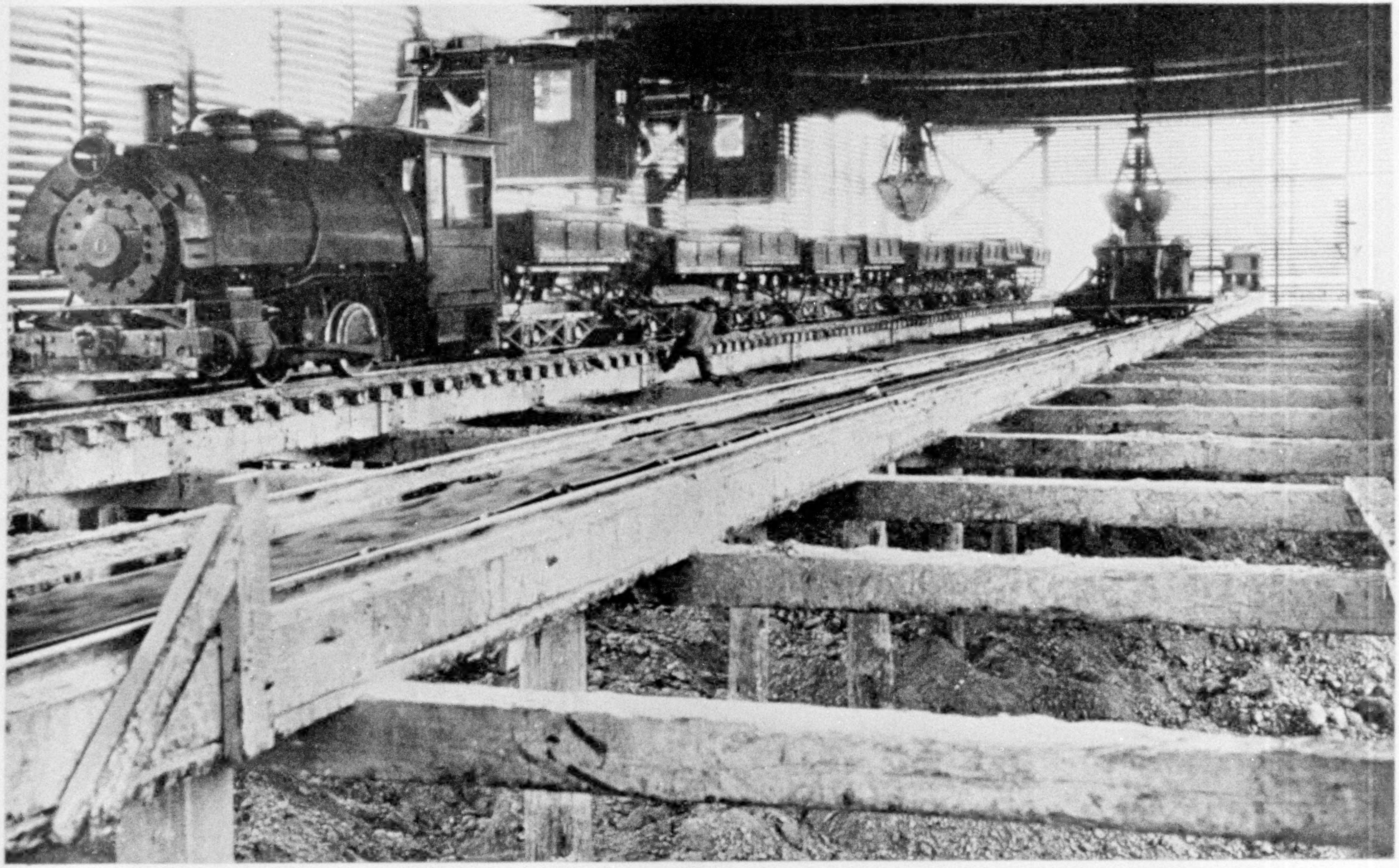
After being dried the earth is conveyed by belts to great bins and from this point the process of grinding, sifting, bolting, and sacking is almost identical with the operation of a flour mill. The output is shipped all over the country, from California to Illinois, Texas, and Indiana, and abroad to Berlin.

Forty per cent of the fuller's earth used in America's refineries comes from this one plant, which means that of every five quarts of oil you put into your automobile engine, two of those quarts have been filtered through Decatur County clay.

At the refineries a filter cloth is placed at the bottom of a capacious metal container into which several tons of fuller's earth are dumped. Oil is admitted under pressure and it drains through the earth, which removes both dirt and carbon, imparting a lighter color to the liquid. After the first filtration, the fuller's earth is washed with gasoline and steamed, then taken out and cooled, and is ready to be used again for a cheaper grade of oil.

The process is repeated four or five times until it is necessary to treat the earth with acid to remove the dirt and carbon with which it has become impregnated. Finally, it goes to the dump heap, its invaluable service to mankind little known or considered.

The only "use" ever found for this dump earth was conceived by a man who asked for and received permission to haul away the refuse at a large Eastern refinery. His activities finally excited the curiosity of the refining company. Was a valuable by-product being overlooked? Investigation revealed the fact that the enterprising individual was sacking the worthless black earth and selling it as fertilizer. The fraud authorities are still on his trail.



DUMPING FULLER'S EARTH INTO STORAGE BINS AT ATTAPULGUS

The stratum of clay which produces this filtering material for lubricating oil underlies a large area in Decatur County (see text, page 305).

A few miles from Attapulgus are the Amsterdam tobacco plantations, with their big battery of modern packing houses. Both shade and bright-leaf tobacco are grown in this section, but a cankerous condition has of recent years seriously curtailed the shade crop. The Department of Agriculture is now engaged in trying to solve the mystery of the disease.

Shade tobacco is grown in fields which are covered with cheesecloth or narrow slats stretched over high frames, thus converting the acres into veritable hothouses on a mammoth scale.

HOW THE TOBACCO IS PLANTED

Shade planting begins early in April. One man pushes before him through the fields a wheel set with teeth to space the plants 10 or 12 inches apart. A woman follows in his tracks and drops a tobacco plant (which has been raised in a seed bed, see page 308) at each mark. A third person armed with a smooth stake five or six inches long and an inch and a half in diameter, with one hand punches holes at the points indicated and with the other hand drops a plant in each hole.

A fourth man with bucket and dipper completes the procession, filling each hole with water. There is no drawing of earth around the plant or tamping down of roots, as this would bruise the plant; the water alone is relied upon to bring the earth around it.

Shade tobacco grows with extreme rapidity, maturing in from 50 to 60 days, by which time it has reached a height of from 7 to 10 feet (see page 309), and is pressing against the top of the shade cloth. But before it has reached this stage it has been attacked by a host of implacable insect enemies, the hornworm, the bud worm, and the wireworm being the most deadly.

The hornworm is usually combatted with Paris green applied with blowers. Frequently the men using these blowers are painfully affected by the poison, in spite of the fact that the precaution is taken to blow the powder back over the shoulder while advancing through the field.

Children are employed almost exclusively in waging the early battle with the bud worm, for the reason that the poison, a mixture of arsenate of lead and corn meal, has to be applied directly into the bud, and it has been found that when the plant is young adults will not stoop low enough to administer this *coup de grace*. Unlike the Paris green brigade, the youthful poisoners suffer no ill effects from their labors.

The bud worm poison, in order to prove effective, must be applied at least three times a week. The magnitude of this operation on a plantation of 500 acres is appalling, for there are some 10,000 plants to the acre, necessitating a total of 15,000,000 pinches of poison placed exactly in the buds each week during the early stages of growth.

Formerly the negro men and women were permitted to sing at their tasks in the packing houses, and in the afternoons, near "quitting time," visitors could occasionally hear marvelous spirituals sung with amazing fervor by natural leaders and supported by a great chorus. But to-day the packing houses are places of silence as busy fingers sort, smoothe, grade, measure, and tie the dried leaves into bales of 175 pounds each, every leaf in a bale supposedly being of the same shape, size, color, and texture. These graders are tobacco artists, and they require north lights in their "studios." Nothing is done by artificial illumination.

ANTIQUE-HUNTING, THE GREATEST OF CROSS-COUNTRY SPORTS

This is the section of Georgia where the antique flourishes. For half a century this game has enjoyed the protection which comes from indifference to its worth, but an open season has been declared of late and the woods are full of pothunters.

A very definite technique has been developed for this sport in south Georgia, for conditions are entirely different from those which obtain in Massachusetts, Connecticut, and Virginia, where nothing in the nature of period furniture is now to be found "by chance."

Back in the eighties and early nineties the craze for "golden oak" and similar products of the Grand Rapids manufacturers reached this section, with the result that priceless old furniture was discarded—thrown into barns or given to negroes living on large estates and plantations.

Hence the following technique: A hunter

A TOBACCO SEED BED IN SOUTH GEORGIA

The young plants must be protected with cheesecloth. The bottles on the stakes merely prevent holes being torn in the covering. Bright-leaf tobacco is raised in sandy soil, while some of the best Sumatra and Cuban tobacco is raised under shade, on the chocolate-colored soil of Decatur County (see text, page 307). The latter varieties are used as wrappers for cigars, while the bright-leaf tobacco, which can be raised all along the southern coastal plain, is used for cigarettes.

motors leisurely through the country, his roving eyes seeking houses of ante bellum or colonial design or perhaps an avenue of trees leading to a forlorn hill where a gaunt chimney tells the tale of fire or decay. These mansions, or remains of them, indicate that the quarry is in hiding in the vicinity.

Having located the manor house, so to speak, the "snooping" proceeds in all the humble neighboring cabins.

Nine times out of ten the objects of the search—spool beds, walnut and mahogany dressing tables, rare old glass, and luster ware—are to be found tucked away in dark and dingy corners, always in sad disrepair and usually obtainable for a pittance. For such homes $2 will buy a far more comfortable chair than the dilapidated affair which Marse Henry rejected from the Big House years ago.

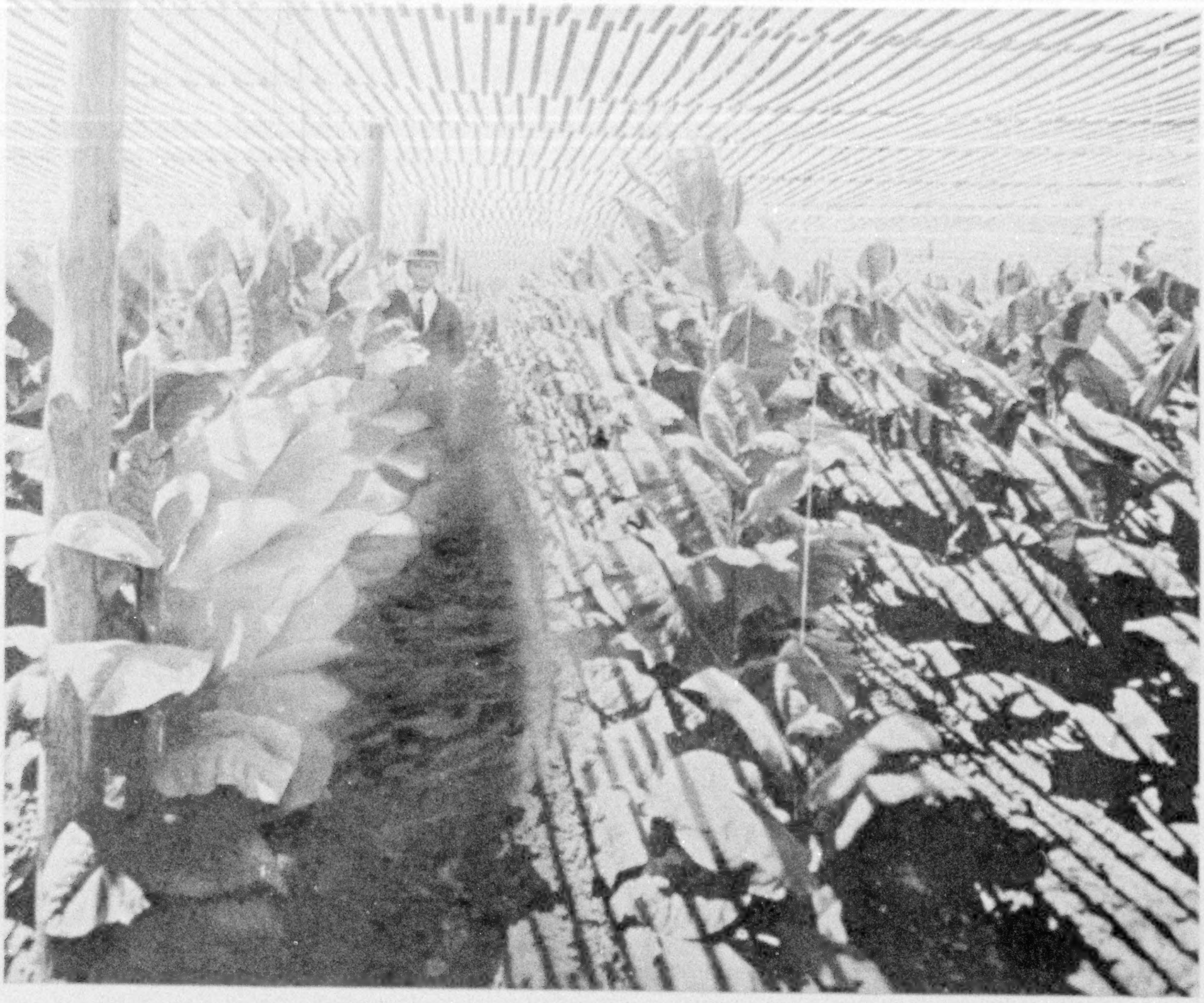
A PROFITABLE BAG

We rose at daybreak for the antique hunt which had been arranged for my edification. It was a stimulating ride through bright-leaf tobacco fields, cornfields, occasional stands of pine timber, cotton fields, pecan groves, and truck gardens—a rich and fertile land stretching all the way from Bainbridge to Cuthbert. The latter, with the possible exception of Athens, boasts as many white-columned colonial homes as any place of its size in the South.

We found our quarry and bagged a ginger jar, a quaint old rocker, a set of old-fashioned cruets, and a pair of ancient brass firedogs.

A PROPHETIC LETTER FOUND IN AN ANTIQUE DESK

As we were leaving the tumble-down storeroom in the rear of the ancient porticoed white house, with its central hall wide enough to suggest a section of Pennsylvania Avenue, I spied among the heterogeneous débris an old walnut lap desk with silver monogram plate and escutcheon.



Photograph from Ethel Fleming Russell

A DECATUR COUNTY PLANTER IN HIS SHADE-TOBACCO FIELD

The shade for this high-grade crop is constructed of narrow wooden slats; the usual type, however, is cheesecloth. In addition to the insect pests (see text, page 307), the tobacco planter constantly faces the menace of hailstorms, which not only rip his shade to pieces, but riddle the tobacco leaves, making them worthless as cigar wrappers. The plants attain a height of from 7 to 10 feet, and when full grown frequently thrust their top leaves between the slats.

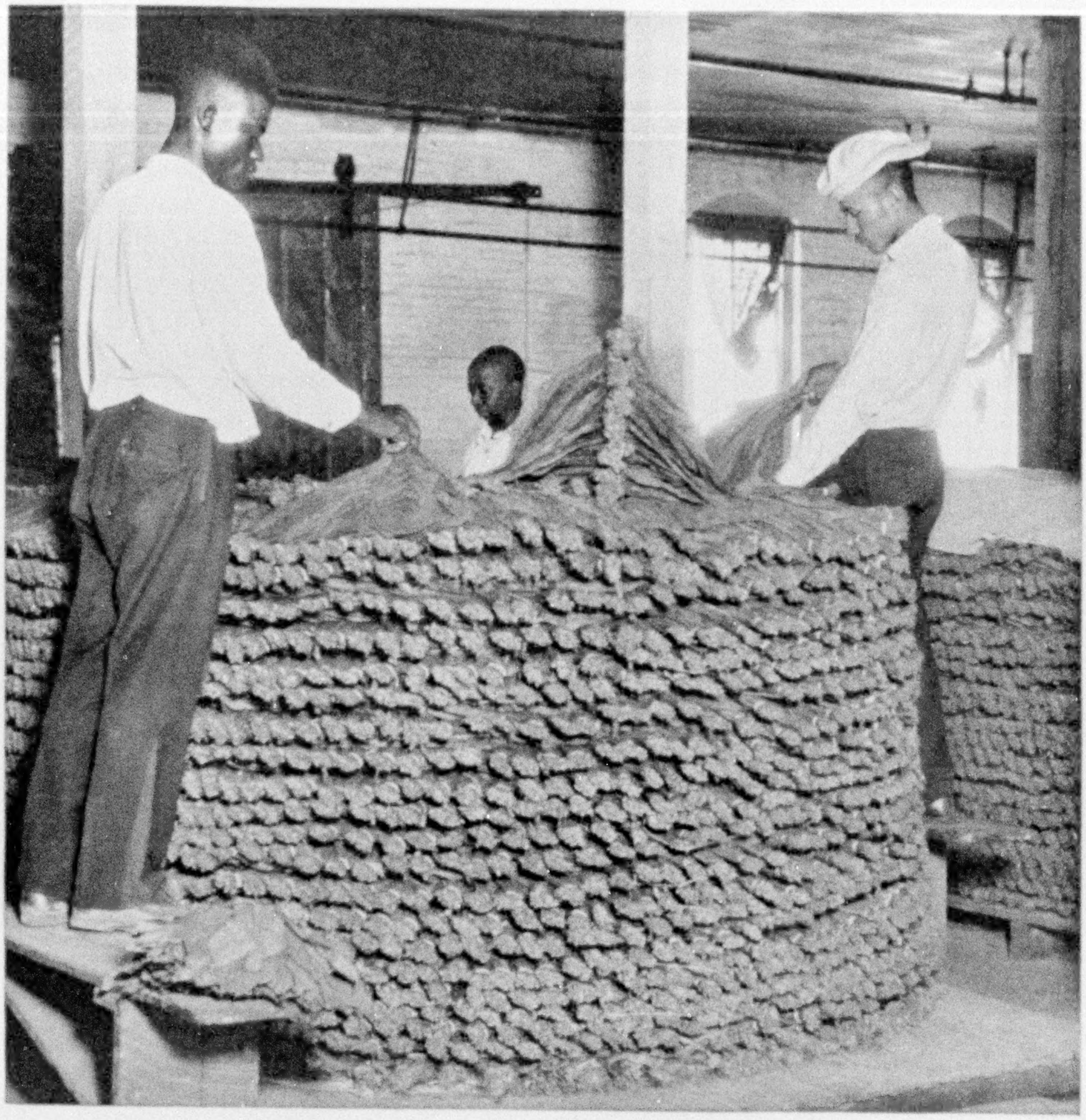
"Do you wish to sell that?" I asked.

"Yes, if you want it; there are four or five of them around the house."

Motoring home that afternoon, I opened my new possession. A great mass of papers fell to the floor of the car—letters, all except one, received by a young Georgia student at the University of Virginia in 1856 and 1857. The exception bore the date "Philadelphia, October 30, 1865," and was addressed to the former student.

Both the writer and the recipient are long since dead; there can be no offense in reproducing a few paragraphs written in admonition and encouragement to a despairing son of the Old South by one of his comrades who found himself in the North at the end of the war:

> In order to develop the resources of your country you need a new working population, for the usefulness of the former is forever lost. You must let bygones be bygones and turn over a new leaf. Encourage immigration and home industry. Let the mechanic know that labor is honorable and he will come down in your midst and pay you for the lumber that is now rotting in your forests.
>
> He will descend further into your mountains and bring forth the iron and coal that are lying there useless and will make use of your water power and establish large factories where now little gristmills are. The more I compare the South with the rest of the world the more I am convinced that our old institution [slavery] was the greatest drawback to it, and that with its abolishment a new era has begun for



PILING SHADE TOBACCO AS A PART OF THE CURING PROCESS

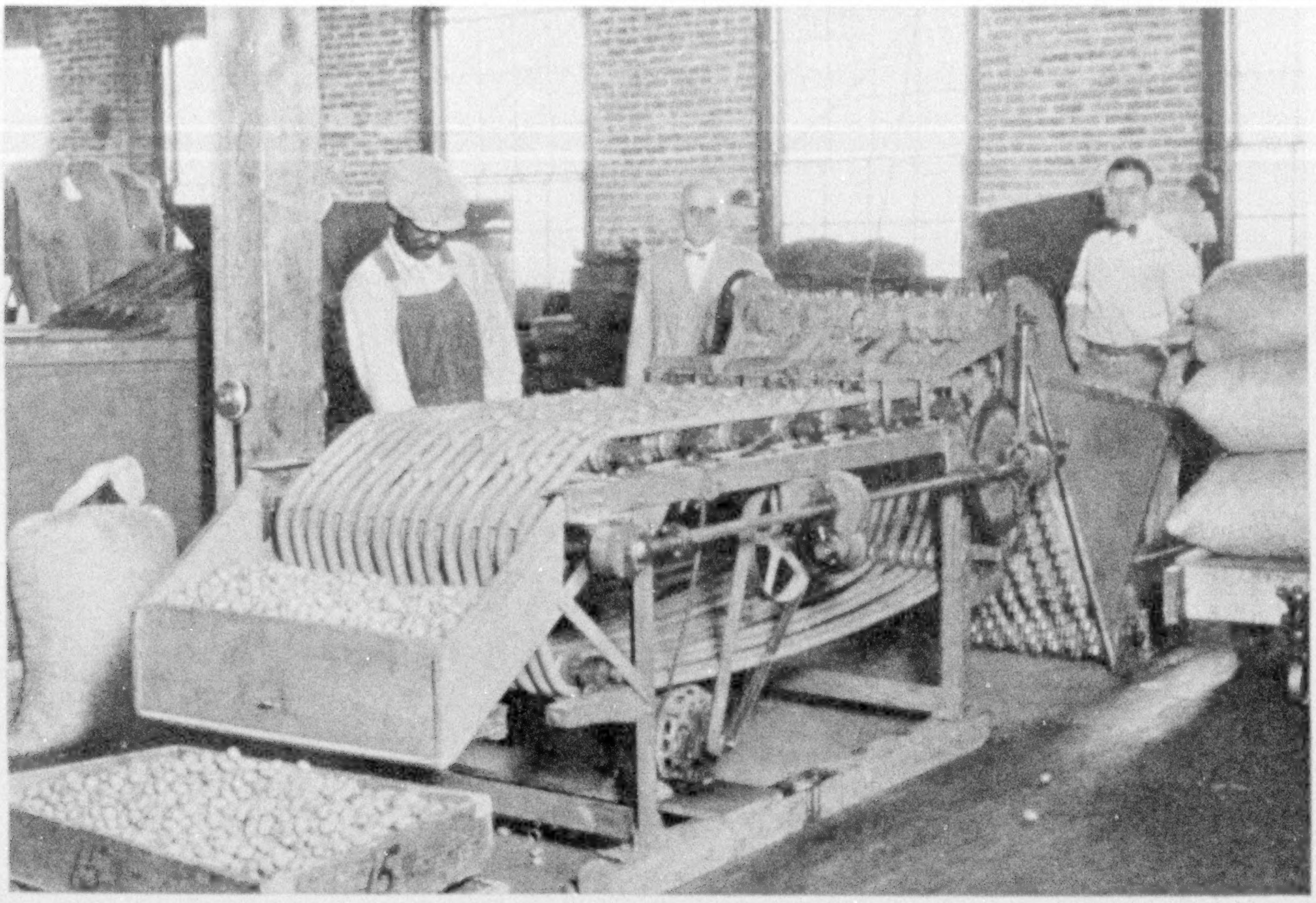
This Sumatra leaf must be carefully watched during curing processes, and a temperature chart of each pile is kept with as much care as the temperature of a patient in a hospital, to prevent fermentation and oversweating.

us and that in our apparent destruction we will yet find our salvation and ultimate independence.

Had ours been more of a manufacturing country, we would have had more soldiers to put in the field; there would have been no lack of rations and clothing in the army; all material of war would have been more abundant; the Tennesseean and North Georgian could not have said "rich man's war and poor man's fighting," for the poor miners of North Georgia would have been as much interested in the success of our cause as the rich planters of southwest Georgia. They would not have deserted by the company.

Almost every manufactured article we had to purchase from the Yankees, though we did so not with the most kindest feeling, yet in this very grudge we paid them a high compliment, for by our employment of their enterprise and their ingenuity we acknowledged their superiority over us in these respects. Need we continue to do so? No, let us make their energy and industry our own and then their "Isms" will have to stay at home and only govern New England.

The work of our political reconstruction is the least item to be achieved. A thorough reorganization of all old systems is what the South needs, and the sooner we take hold of the issue as it is before us the better it will be.



GRADING PAPER-SHELL PECANS IN A COÖPERATIVE PECAN WAREHOUSE AT ALBANY

By virtue of the fact that the fruit from 70,000 acres of nut groves is marketed through Albany, this thriving city proclaims itself the "World's Pecan Center." Albany, as an additional bid for distinction, a few months ago received the grand award "for best accomplishments among 400 cities of the United States in fire prevention."

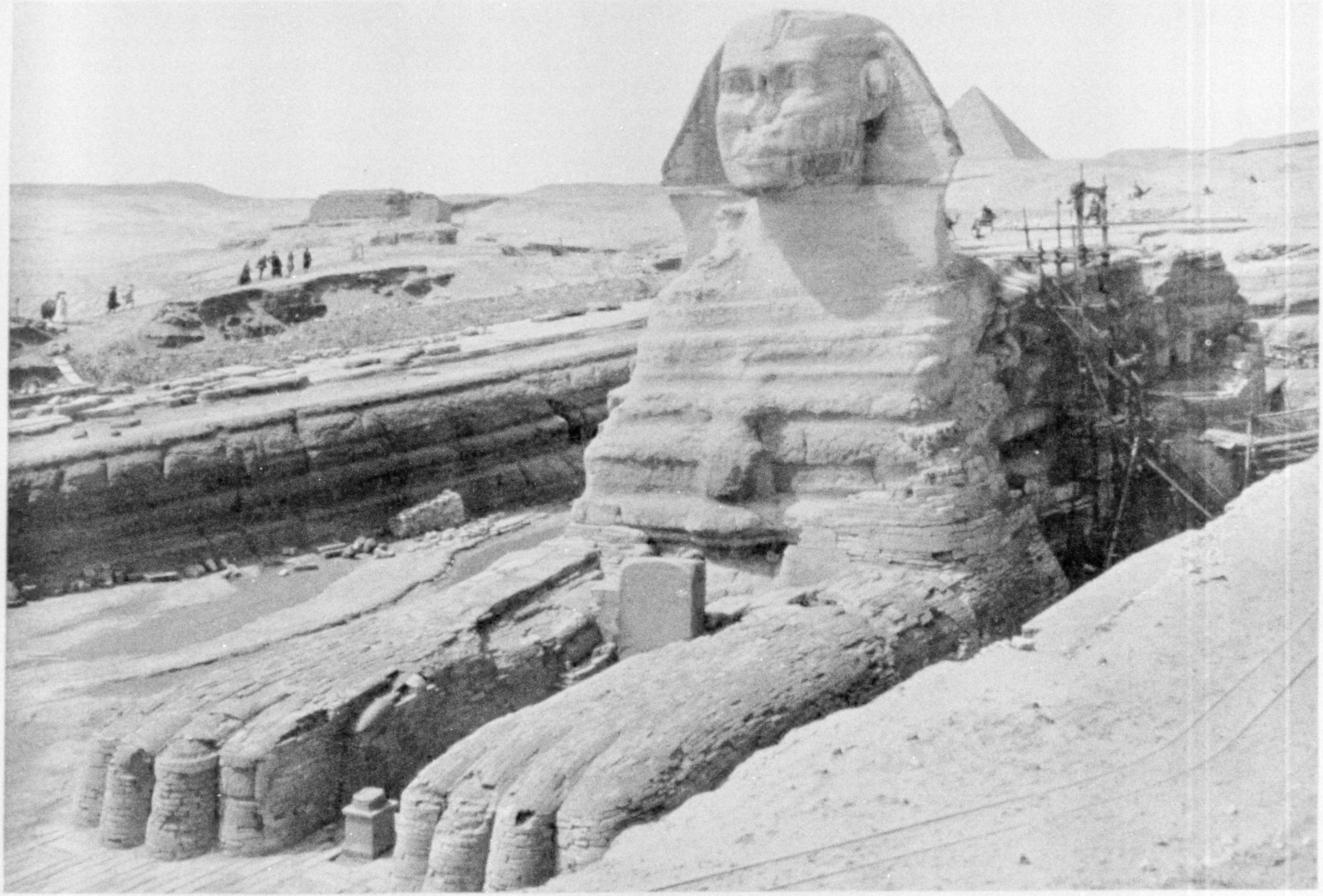
> For your personal success I have no fear; I know you to be industrious and enterprising, but what such boys as —— and —— and many others will do who think labor to be a disgrace, I do not know.
>
> I remember one time at Cuthbert that the young ladies laughed at me because I carried a glue pot across the yard. Those young ladies will have to change their opinions ere they can expect to get along under the new order of things, for labor is bound to be respected.

I had completed my march through Georgia 60 years after the events which brought forth that prophecy and admonition.

It seems to me, in the light of what I have seen, that Georgians are utilizing with both industry and vision their State's resources of incomparable wealth and infinite diversity.

"Empire State of the South" is no longer merely a high-sounding phrase, but is becoming once more an actuality.

◆



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UNCOVERING THE SPHINX

The feet of the mysterious colossus of the Nile are now on exhibition for the first time in forty years. The Egyptian Government has undertaken the Herculean task of clearing away some of the mountain of sand that has drifted around the famous statue, and is filling in some rather alarming cracks with specially prepared cement.

FLYING OVER EGYPT, SINAI, AND PALESTINE

Looking Down Upon the Holy Land During an Air Journey of Two and a Half Hours from Cairo to Jerusalem

By Brigadier General P. R. C. Groves, C. B., C. M. G., D. S. O., and Major J. R. McCrindle, O. B. E., M. C.

EGYPT is destined to become one of the most important air-traffic centers in the Eastern Hemisphere, for Cairo will be the junction of two great airways—that from Europe to the East via Italy, Crete, Solum, Cairo, Bagdad, Basra, and thence along the northern shore of the Persian Gulf to Karachi, and that which will cross Africa almost in a straight line from the Cape to Cairo.

Both of these air routes have been flown over, the former on numerous occasions, the latter only twice, although it was surveyed and sites for its principal landing grounds were selected as far back as 1919. The first flight was made in 1920, the second early in 1926, when the return trip from the Cape to Cairo was made in ten and one-half days.

The Cairo-Bagdad section of the eastern route has been in regular operation by the British Royal Air Force for several years. The service, which is by airplane, is at present fortnightly and is maintained for the use of government officials and to carry important mails.

When commercial aviation has established a base in Egypt, the prospect for the air tourist will be alluring. In addition to the romantic air journey to the East (the route as far as Karachi will be taken over early next year by the subsidized British air combine known as Imperial Airways) he will be able to fly southward up the Nile by seaplane to Luxor, Philæ, and Khartum; or westward to the historic oases in the Libyan Desert, or northeast across the Desert of Sinai to Palestine (see map, page 315).

CAIRO TO JERUSALEM IN 150 MINUTES

This last trip promises to be popular, for the airplane offers very marked advantages over existing means of transport between Egypt and Palestine. The journey by the Desert Railway is long and tedious, and the motorist is handicapped by a shortage of fuel and repair depots and by a scarcity of good automobile roads.

But by air Jerusalem is only two and a half hours distant from Cairo by the normal route, which is via Ismailia to the north shore of Sinai and thence along the coast.

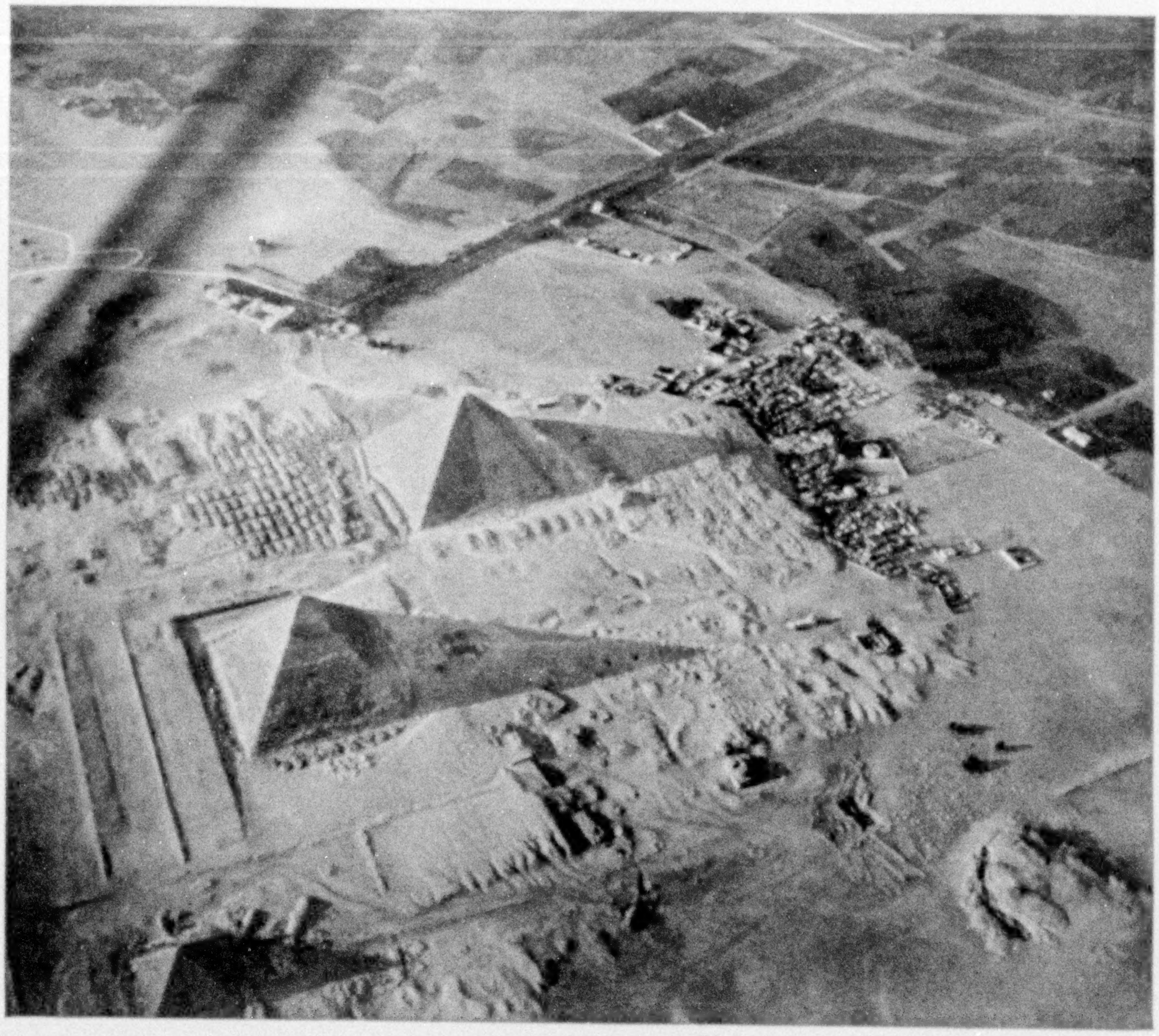
Along this route there are numerous excellent landing grounds. In Palestine there are good landing fields near each of the seagirt cities on the border of the maritime plain.

Jerusalem, although it stands in a limestone wilderness among the Judean hills, possesses an airdrome. It is also possible to land near the Sea of Galilee, at one spot on the shores of the Dead Sea, and at Jericho, which, it will be remembered, is far down in the deep valley of the Jordan.

The principal airport in Egypt will be Heliopolis, a suburb of Cairo, situated on the edge of the desert.

The airdrome at El Kantara, on the east bank of the Suez Canal, will probably be the point of departure for passengers and mails arriving at Port Said by sea and proceeding to India and the Far East by airplane. Ismailia has already been selected as an airship station and a mooring mast is in process of erection there. But both El Kantara and Ismailia are far from the capital and possess no hotel accommodations.

Heliopolis, which is already designated as the northern terminus of the Cape-to-Cairo route, is also the most convenient center for the air tourist who wishes to make Egypt his base. Here, within a few minutes' drive of the capital, Nature has provided, in the shape of a vast gravelly plain, one of the finest airdromes in the



Photograph from Brig. Gen. P. R. C. Groves

LOOKING DOWN ON THE PYRAMIDS OF GIZEH AND THE SPHINX AT SUNSET FROM A HEIGHT OF 4,000 FEET

Above the farthest pyramid in the photograph is the road to Cairo, terminating in the Mena House Hotel. In line with and just beyond the point of the shadow of the middle pyramid is the Sphinx (see, also, page 312).

world. It is already well supplied with workshops and hangars, for it served as headquarters for four training squadrons during the World War.

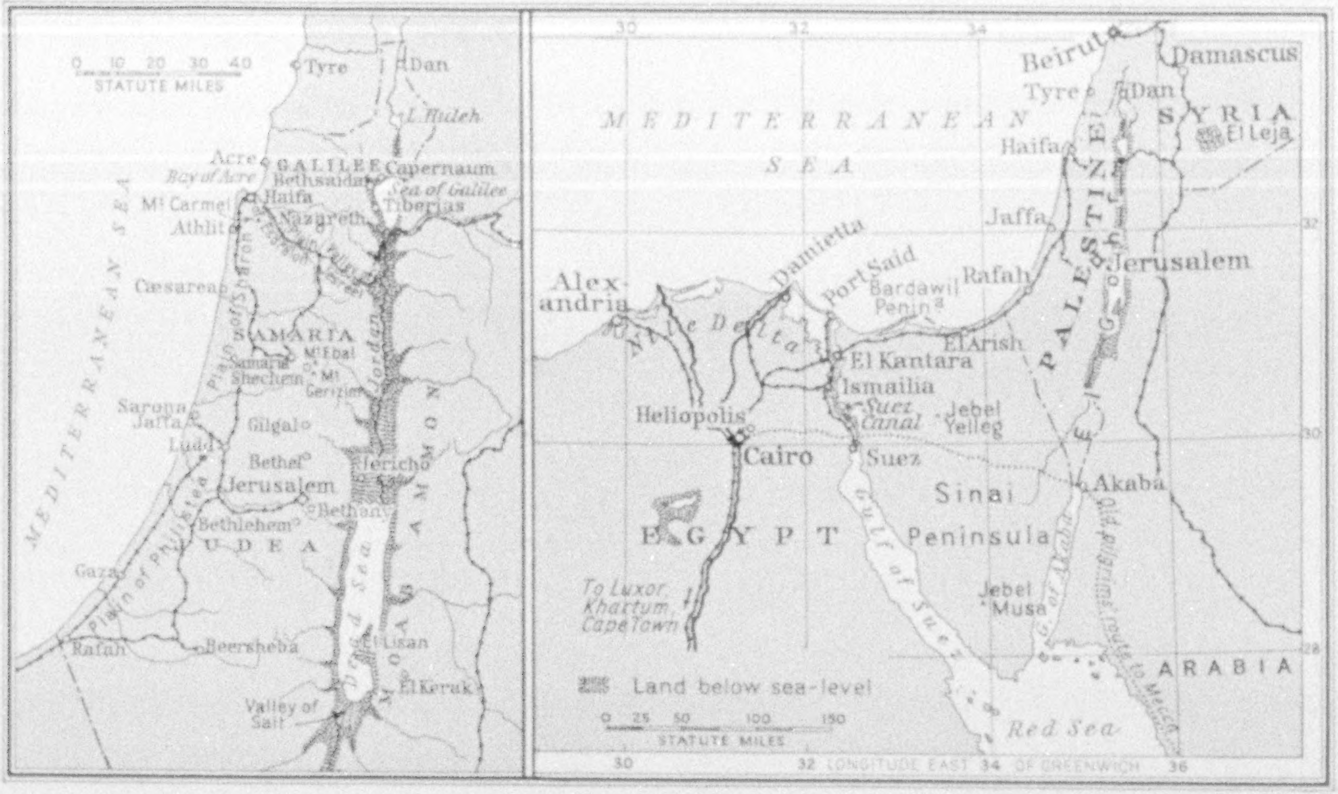
"A CITY OF MARBLE SET IN A GARDEN"

As we rise from this field a wonderful panorama opens up—the great white city of Cairo, with its innumerable domes and minarets; the majestic Nile, snaking away southward into the desert and northward into the Delta; and the Delta itself, emerald green, studded with brown, mud-built little villages and intersected by a perfect spider's web of tiny canals.

The clear line of demarcation between desert and Delta is striking and the contrast is very beautiful. Indeed, the whole color scheme of the land of the Pharaohs, viewed from an altitude of 6,000 or 8,000 feet above Cairo, is perhaps unique. First, the city, which might be made of marble, set in the apex of an immense fan-shaped garden, the Delta. This in turn is inclosed by a desert, which appears as a patchwork of soft shades in which golden brown, pearl gray, and saffron predominate.

This dappled wilderness of sand and rock stretches into infinite distance, but never to a clearly defined skyline, for the junction of earth and sky is hidden by a bank of blue haze into which the Nile disappears as a faintly gleaming silver thread.

Twenty minutes' flight northeastward


0 10 20 30 40
STATUTE MILES
Tyre
Dan
L. Huleh
Acre
GALILEE
Capernaum
Bay of Acre
Bethsaida
Sea of Galilee
Haifa
Tiberias
Mt Carmel
Nazareth
Athlit
Cæsarea
MEDITERRANEAN SEA
SAMARIA
Mt Ebal
Samaria
Shechem
Mt Gerizim
Jordan
Sarona
Jaffa
Gilgal
Ludd
Bethel
Jericho
Jerusalem
Bethany
Bethlehem
JUDEA
AMMON
MOAB
Gaza
Plain of Philistia
Plain of Sharon
Dead Sea
Lisan
Rafah
Beersheba
El Kerak
Valley of Salt
30
32
34
Beirut
Damascus
Tyre
Dan
SYRIA
MEDITERRANEAN SEA
El Leja
Haifa
Jaffa
Jerusalem
PALESTINE
Damietta
Port Said
Bardawil Penin.
Rafah
Alexandria
Nile Delta
El Arish
El Kantara
Ismailia
Suez Canal
Jebel Yelleg
Heliopolis
Cairo
Suez
Akaba
Sinai Peninsula
EGYPT
To Luxor, Khartum, Cape Town
Gulf of Suez
Gulf of Akaba
Jebel Musa
Old pilgrims route to Mecca
ARABIA
Land below sea-level
0 25 50 100 150
STATUTE MILES
Red Sea
30
32 LONGITUDE EAST 34 OF GREENWICH 36

Drawn by C. E. Riddiford

THE TERRITORY OBSERVED IN THE AUTHORS' FLIGHT OVER EGYPT, SINAI, AND PALESTINE

At the left is a more detailed map of Palestine, lying between the Mediterranean and the Valley of the Jordan.

brings the Suez Canal into view. From the air it looks like a narrow blue ribbon stretched across the face of the desert. The azure patches through which it passes are the lakes—Balah, Timsah, and the Great and Small Bitter. Timsah was once a crocodile-haunted swamp; hence its name, which is Arabic for crocodile; the others were small salt marshes; but all are now merely extensive pools of sea water filling hollows in the sand.

Ismailia, where there is an excellent airdrome, is built on the northern shore of Timsah. It is the headquarters of the Canal administration and is a well-laid-out little town, bowered in green, with pleasant gardens and shady walks bordering the lake.

THE SUEZ CANAL SEEN FROM THE AIR

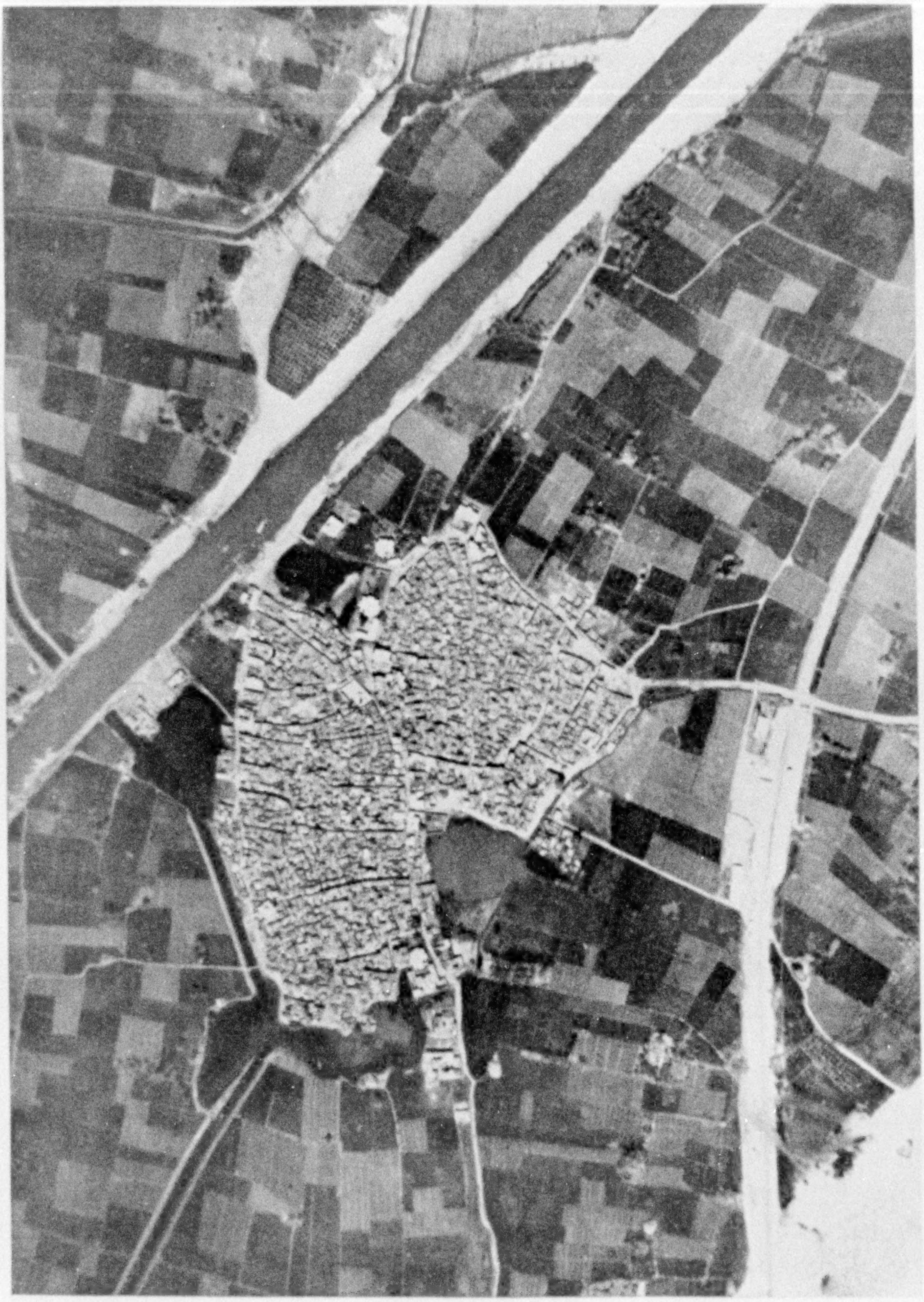
It is worth while to circle here and take in the view. Below us lies the narrow waterway which connects East and West; passing through it are craft of every description—passenger liners, easily recognized by their long expanse of snowy decks or, if it be summer, by their great spread of awnings; ocean tramps, grimy looking, even from a height of 6,000 feet; busy tugs trailing long black plumes of smoke, and tiny white launches. The fan of ripples and the wake made by each of these craft stand out clearly.

The lakes are dotted with the sails of Arab fishing boats. Eastward the barren waste of Sinai reaches to the limit of vision. To the west the Egyptian desert extends to a dark belt, the Delta. Northward one can see the wide sweep of the Bay of Tina (Tineh), the nearest part of the Mediterranean. Far away to the south lies a pale-blue shadow, the Gulf of Suez.

SALT DEPOSITS RESEMBLE VAST SNOWDRIFTS

For the next 70 miles the course is northeast across an undulating expanse of opalescent sand. Despite the sand, this area, between Ismailia and the Bardawil Peninsula, is not waterless. When flying over it you note here and there small oases of palms which nestle in the deeper hollows among sand dunes. Some of these oases are marked on the map, their names prefixed by the word *Bir*, which is Arabic for well.

The Bardawil Peninsula, which we skirt as we near the sea, presents a remarkable sight from the air. It incloses



Photograph from Brig. Gen. P. R. C. Groves

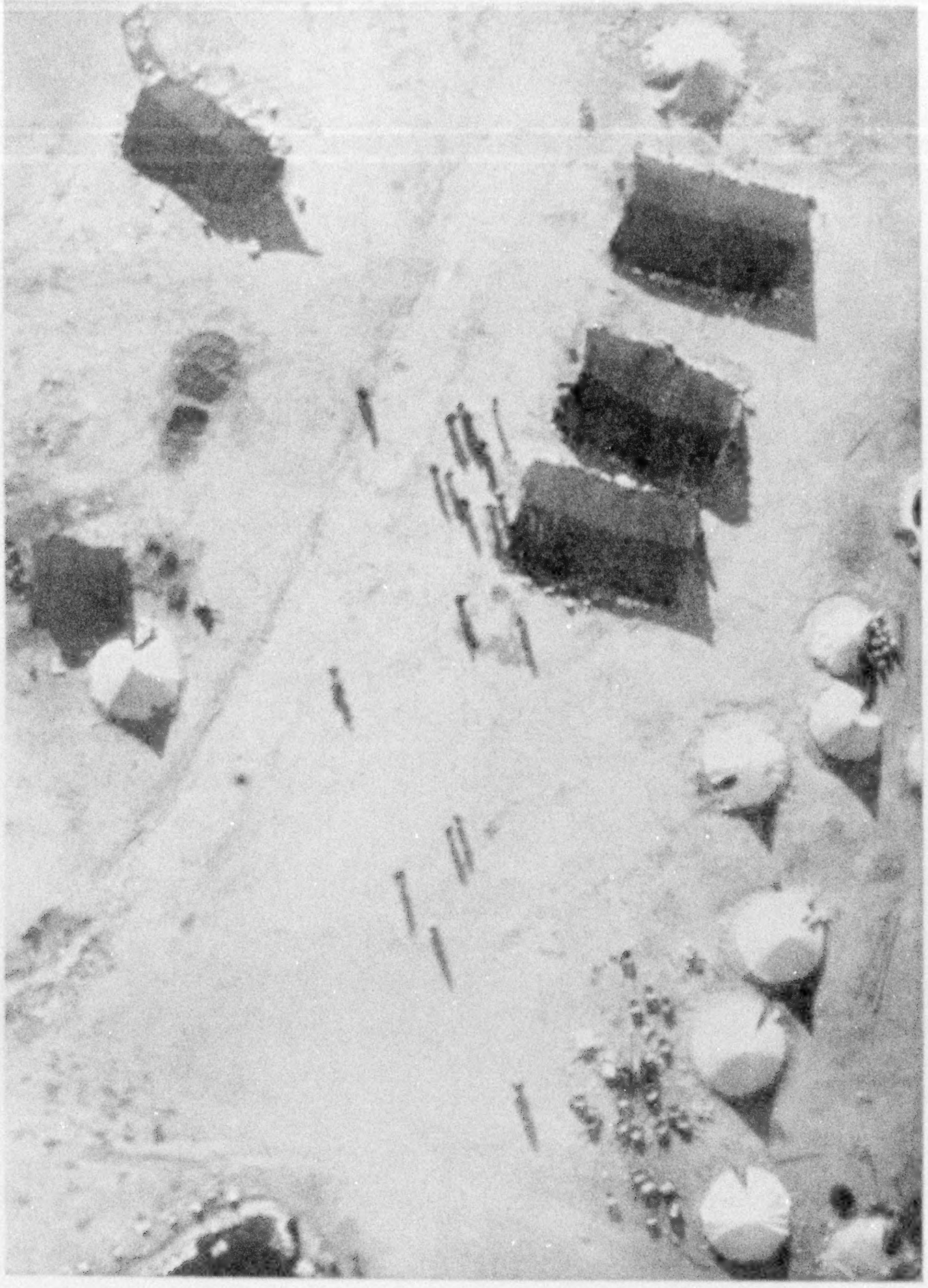
A TOWN NEAR THE EDGE OF THE DELTA BETWEEN CAIRO AND ISMAILIA

The desert is seen in the lower right corner of the photograph. The broad band running diagonally above the town is a canal, and the curving band to the right is a railway. The numerous rectangles which cover the photograph, made from a height of 9,600 feet, are fields under cultivation. The town consists of flat-roofed houses built of mud.

a shallow lagoon 30 miles long by several miles wide. The extensive, low-lying flats which border the lagoon are covered by a deposit of salt, and from a distance look like immense snowdrifts.

On reaching the coast we turn a few points eastward and fly along the surf line. On our right, as far as the eye can see, stretches the desert of Sinai, a scarred, desolate landscape riven by tortuous wadies and gullies which wind between groups and chains of copper-colored hills. Forty miles away to the south the Jebel Yelleg, a group of fantastic rocky peaks, rises abruptly from the plain.

There is a widespread impression that Sinai is, for the most part, a flat sandy desert. This illusion, which can, perhaps, be traced to the Scriptural illustrations of several decades ago, is, of course, at once dispelled by reference to a map. But how many members of the general public study maps after their school days?



Photograph from Brig. Gen. P. R. C. Groves

A "CLOSE-UP" OF AN ARAB ENCAMPMENT IN THE SINAI DESERT

The white objects are bell tents, and the large black ones are Arab camel's-hair tents. The nail-like dots are men and their shadows. This photograph was taken from a height of 300 feet.

A wide belt of undulating sand extends along the northern coast of Sinai and sweeps southward along the east side of the Suez Canal; but the rest of Sinai is sandy only in patches; it is mostly hilly and in many parts mountainous.

LOOKING DOWN ON THE ROAD OF THE FLIGHT INTO EGYPT

Some of the rocky peaks in the escarpment, which occupies the peninsula itself, tower to a height of more than 8,000 feet. One of these, Jebel Musa (Mountain of Moses), which you may see when flying from Suez to Akaba, is the traditional site of the Hebrew law giving.*

The northern sand belt, across which we had been peering into this solitude, is from 20 to 30 miles wide. It reflects an intolerable glare which strikes up under the eyelids, and it is a relief to turn to the Mediterranean, which, viewed from

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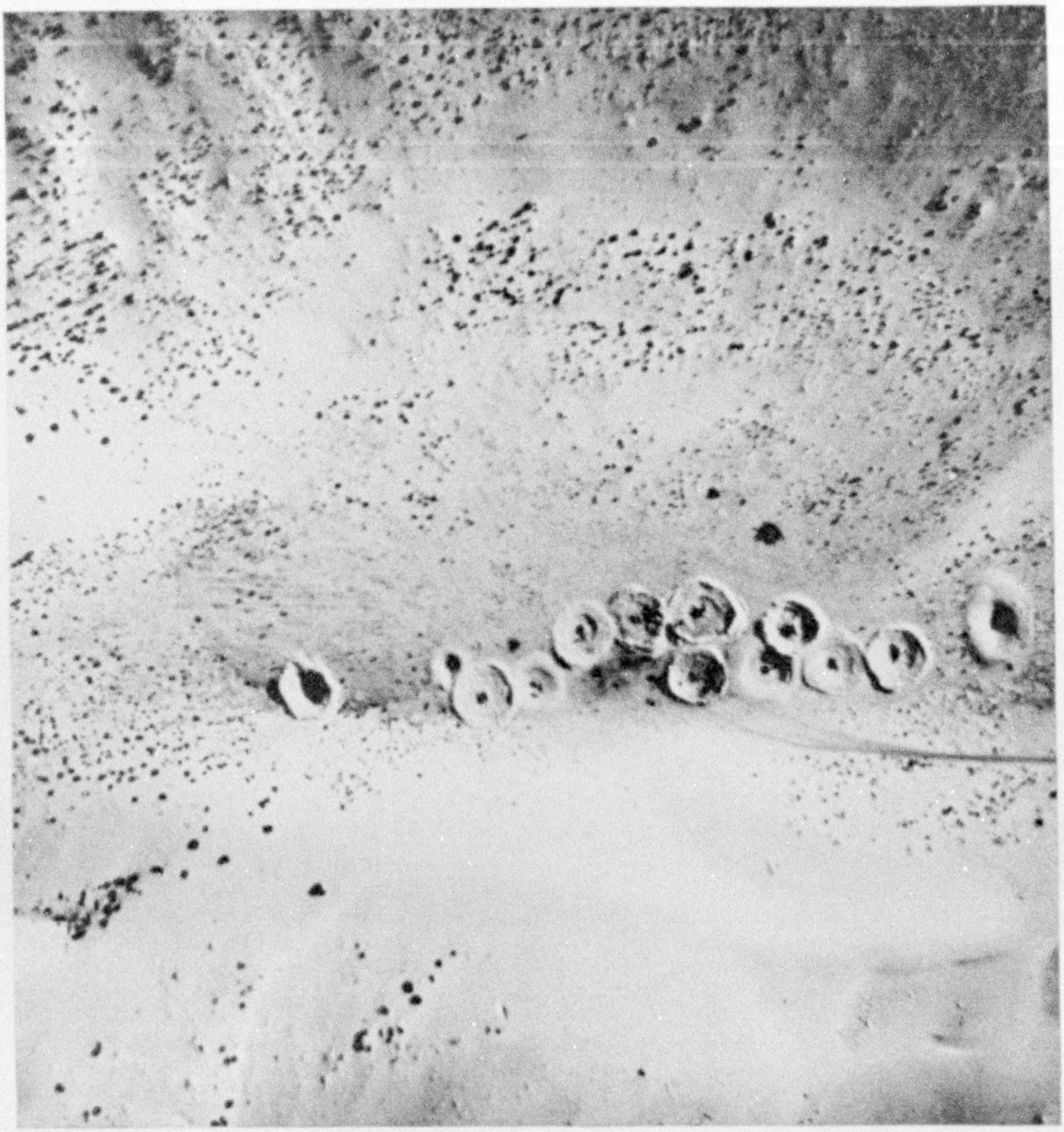
* See, also, "The Route Over Which Moses Led the Children of Israel Out of Egypt," by Franklin E. Hoskins, in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1909.



Photograph from Brig. Gen. P. R. C. Groves

WELLS IN THE DESERT 30 MILES EAST OF EL KANTARA SUGGEST CRATERS OF THE MOON

The numerous dots in the photograph are bushes. A track leading off from one of the wells can be seen to the right of the photograph, which was taken from a height of 2,500 feet.

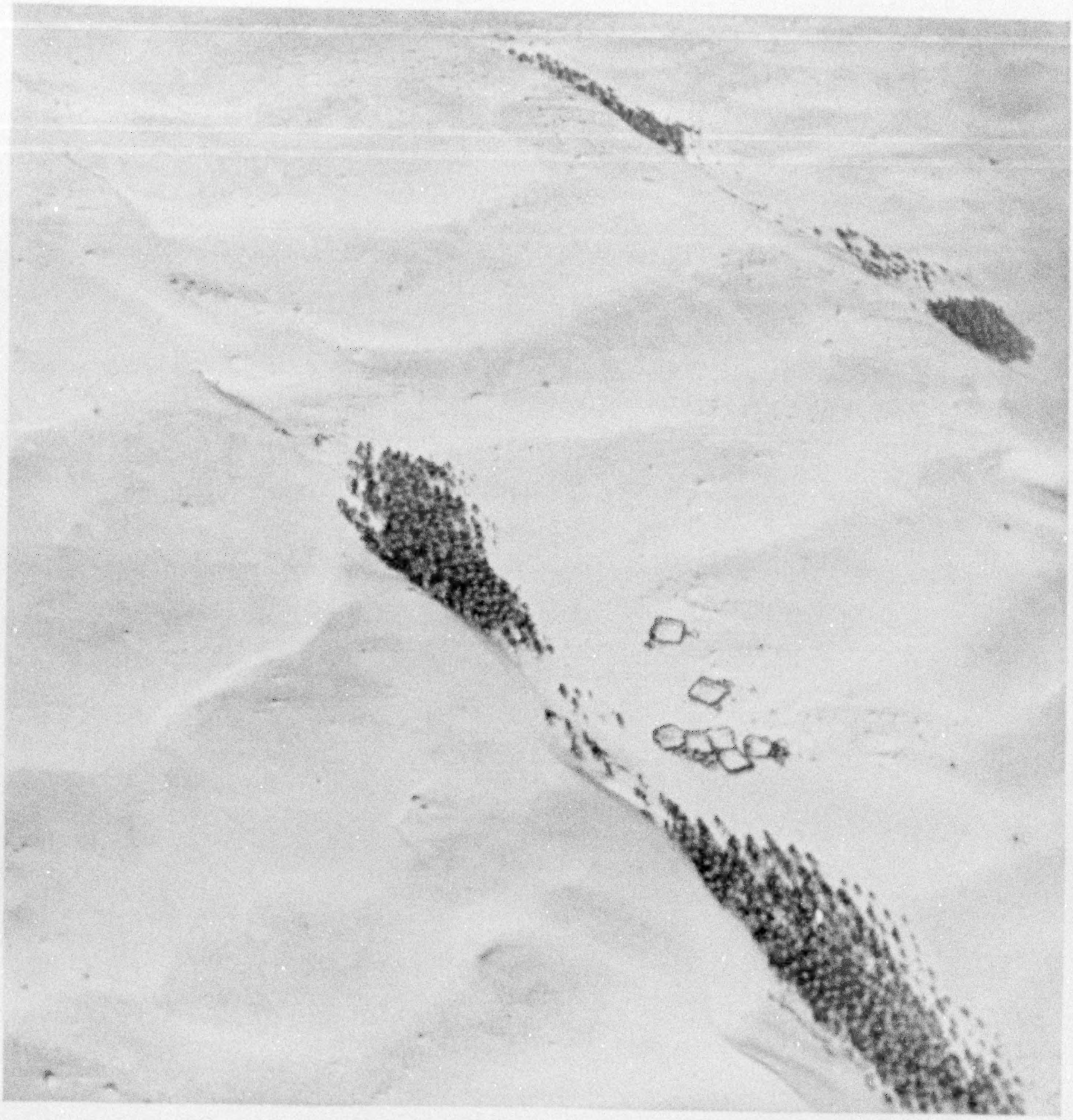
our altitude, appears to be an immense bank of blue water rising gently to the skyline.

But there is something of special interest almost vertically below us.

Look down over the right side of the plane. That narrow strip which winds among the sand dunes is a road; it is, perhaps, the oldest road on earth. Nearly 2,000 years ago a man passed along it leading an ass bearing a woman and a Child. That was at the dawn of the Christian Era. But the road was a thoroughfare long before that, for it was part of the immemorial caravan route between the Euphrates and the Nile.

Here have passed in turn many of the great captains who made history. All down the ages armies have moved along it in victory or in flight. It has lost most of its significance now, for those close-set threads which run beside it are the rails of the Desert Railway.

Less than half an hour's flight along the coast from the Bardawil Peninsula brings us over a flat-roofed town built



Photograph from Brig. Gen. P. R. C. Groves

SMALL OASES IN THE HOLLOWS OF THE SANDY DESERT 40 MILES NORTHEAST OF ISMAILIA

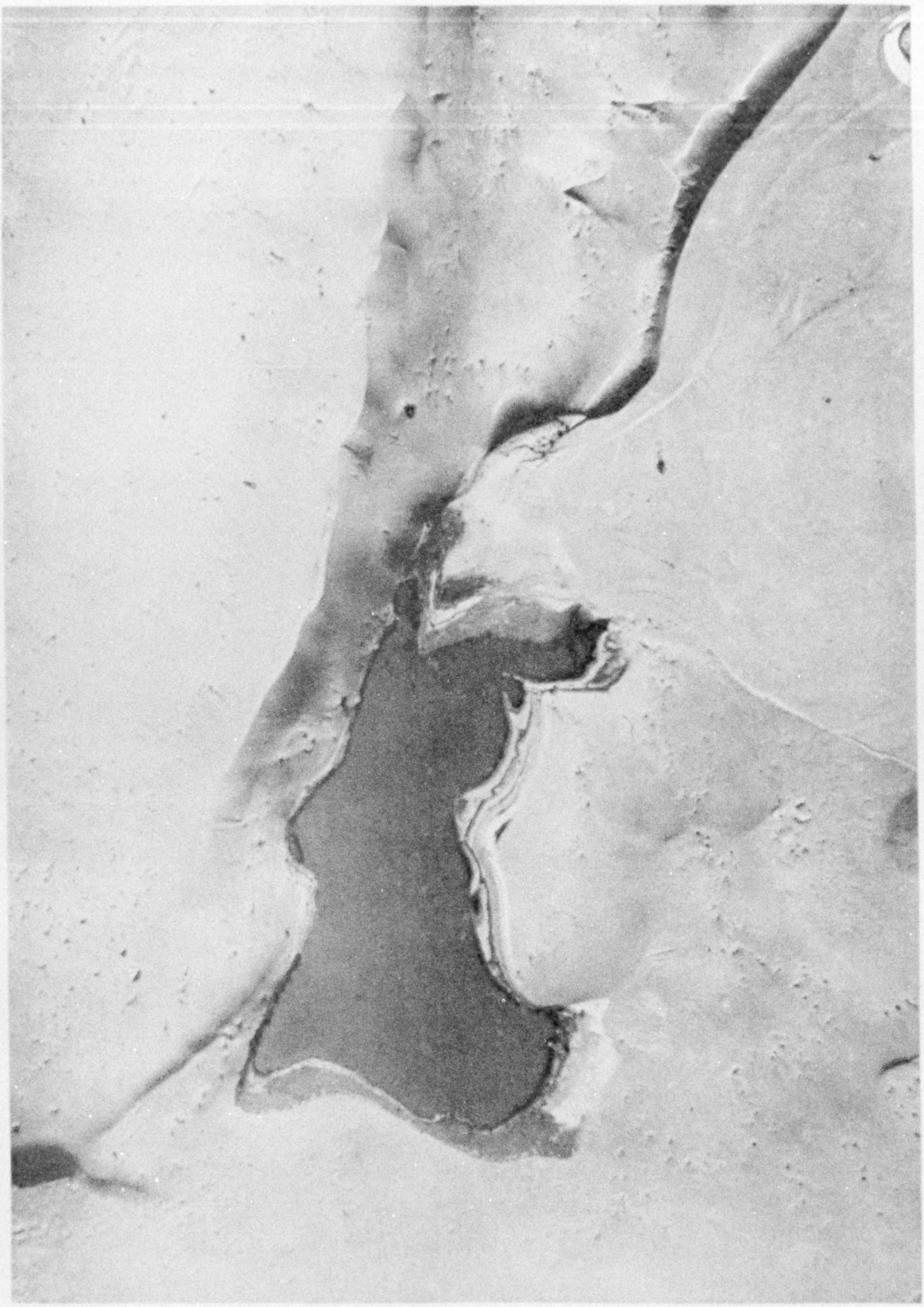
The rectangular inclosures between the two nearer oases are made of palm leaves and scrub and are used for herding camels and goats. This photograph was taken from a height of 4,000 feet.

near the mouth of a wide bowlder-strewn watercourse. This is El Arish, a dreary-looking little place surrounded by sand and sparse scrub.

Its name is familiar to students of strategy because of Napoleon's dictum, "He who holds El Arish holds the key to Egypt." In his day, and indeed until comparatively recent times, the waterless waste inland presented an almost insuperable barrier to any considerable body of troops. The only other highway across Sinai was the Darb el-Haj, the old pilgrims' route to Mecca via Suez and Akaba. But that has always been easy to defend, because many miles of it pass through a narrow gorge within easy reach of Suez.

Neither of these time-honored approaches to Egypt is essential to an invader now. Science, in the shape of aircraft, caterpillar transport, and improvements in methods of well-boring, has annulled Napoleon's maxim.

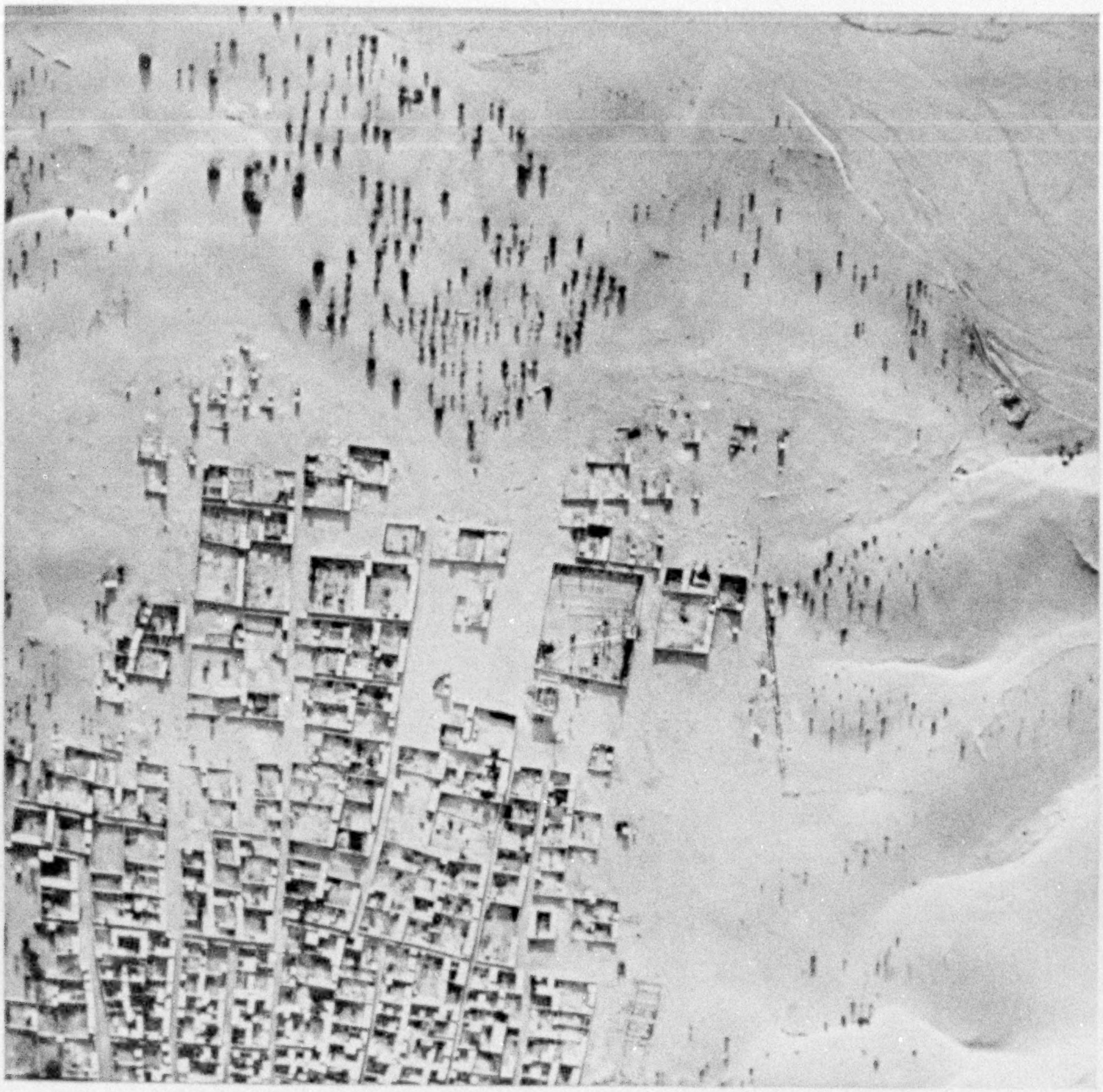
Soon after passing El Arish, look forward through the whirling airscrew and



Photograph from Brig. Gen. P. R. C. Groves

A POOL IN THE WATERCOURSE KNOWN AS THE WADI MUKSHEIB, EAST OF THE SUEZ CANAL

This photograph was taken from a height of 6,000 feet. The light is from the left; hence the high ridge of sand on the left of the pool shows up clearly.



Photograph from Brig. Gen. P. R. C. Groves

EL ARISH PHOTOGRAPHED FROM A HEIGHT OF 6,000 FEET

The small, flat-roofed houses are built around the sides of extensive courtyards. The black objects on the outskirts of the town are bushes, acacia and tamarisk, and their shadows.

you see faint tinges of green on the horizon. These are long fingers of grass land stretching out from Palestine into Sinai.

OVER THE PLAINS OF PHILISTIA AND SHARON

At the small village of Rafah, where we cross the frontier, the country is already green, and, although there are tracts of sand at intervals, the landscape grows greener as we advance.

Gaza, the name recalling the story of Samson and the Philistines, is a sprawling white city surrounded by orange groves and separated from the sea by a wide belt of sand dunes. We have now reached the southern end of the great maritime plain which stretches from Mount Carmel to Gaza and is bounded on the east by the Judean hills (see p. 343).

Between Gaza and Jaffa this rolling, well-watered downland, dotted with towns and villages which are surrounded by cultivation, is known as the Plain of Philistia; north of Jaffa it is called the Plain of Sharon.

Half an hour's flight along the sea border of this smiling country brings us to Jaffa. Viewed from above, the place certainly deserves its original Hebrew name, which was Japho—The Beautiful (p. 340).

Picture a white city bordering a sea which may be any shade between cobalt and sapphire. A few hundred yards out from the sea front there are numerous outcrops of rock, through which the long rollers run in sheets of foam. The ships of Hiram, King of Tyre, which in the days of Solomon carried Lebanon timber to Jaffa for the building of the Temple, must have found it difficult to enter the little port in rough weather.

Jaffa is famous throughout Europe for its oranges. The orange groves border the outskirts of the city and extend for many square miles into the surrounding country. Some of these groves are interspersed with other fruit trees. In the blossom season the scene is entrancing. On a still day in spring you may smell the perfume of the orange blossoms at a height of several thousand feet.

ZION COLONISTS DWELL IN WELL-LAID-OUT SETTLEMENTS

As we survey the surrounding country from above Jaffa, we note numerous little settlements which are clearly European. Each has a church; the houses have red-tiled roofs and stand in gardens or compounds. The majority of these well-laid-out settlements, which contrast with the huddled, white, native villages, are Zionist colonies, their inhabitants being mostly emigrants from Europe. One of the largest, however, Sarona (situated two miles northeast of Jaffa), is owned by the German Temple Sect and is a flourishing little place surrounded by orange groves and vineyards.

Continuing northward, we fly over the fertile plain of Sharon to Cæsarea. This once splendid seaport, built by Herod in 22 B. C. and named after Augustus Cæsar, is now little more than a village. A few half-buried ruins mark the site of its temples, amphitheater, and baths. The great semicircular mole which formed the harbor in ancient times has disappeared. It reached out from a jettylike piece of land. On a calm day part of it may still be traced under water.

RELICS OF THE CRUSADERS

As Cæsarea falls away behind us, dwindling rapidly until it becomes a mere patch of white on the seashore, Athlit, built on a curious little horn-shaped promontory, looms up ahead. A nearer view discloses a huddled village dominated by the extensive ruins of what must have been a splendid castle. This was the celebrated stronghold of the Crusaders known as the Castle of the Pilgrims (see illustration, page 342).

There are many such ruins in Palestine—relics of those romantic centuries when the chivalry of Christendom, stirred by the fiery eloquence of Peter the Hermit and his successors, came with great armies to these shores to wrest the holy places from the infidel.

While flying up the coast from Jaffa we notice that the hills on the right are closing in toward the sea. The plain below, which at Jaffa was some 20 miles in width, has narrowed to three miles at Athlit, and a little farther on dwindles to a few hundred yards, where it rounds Mount Carmel. This mountain, which is a long spur reaching out from the highlands of Samaria, is covered with oak woods and orchards of almonds and pears.

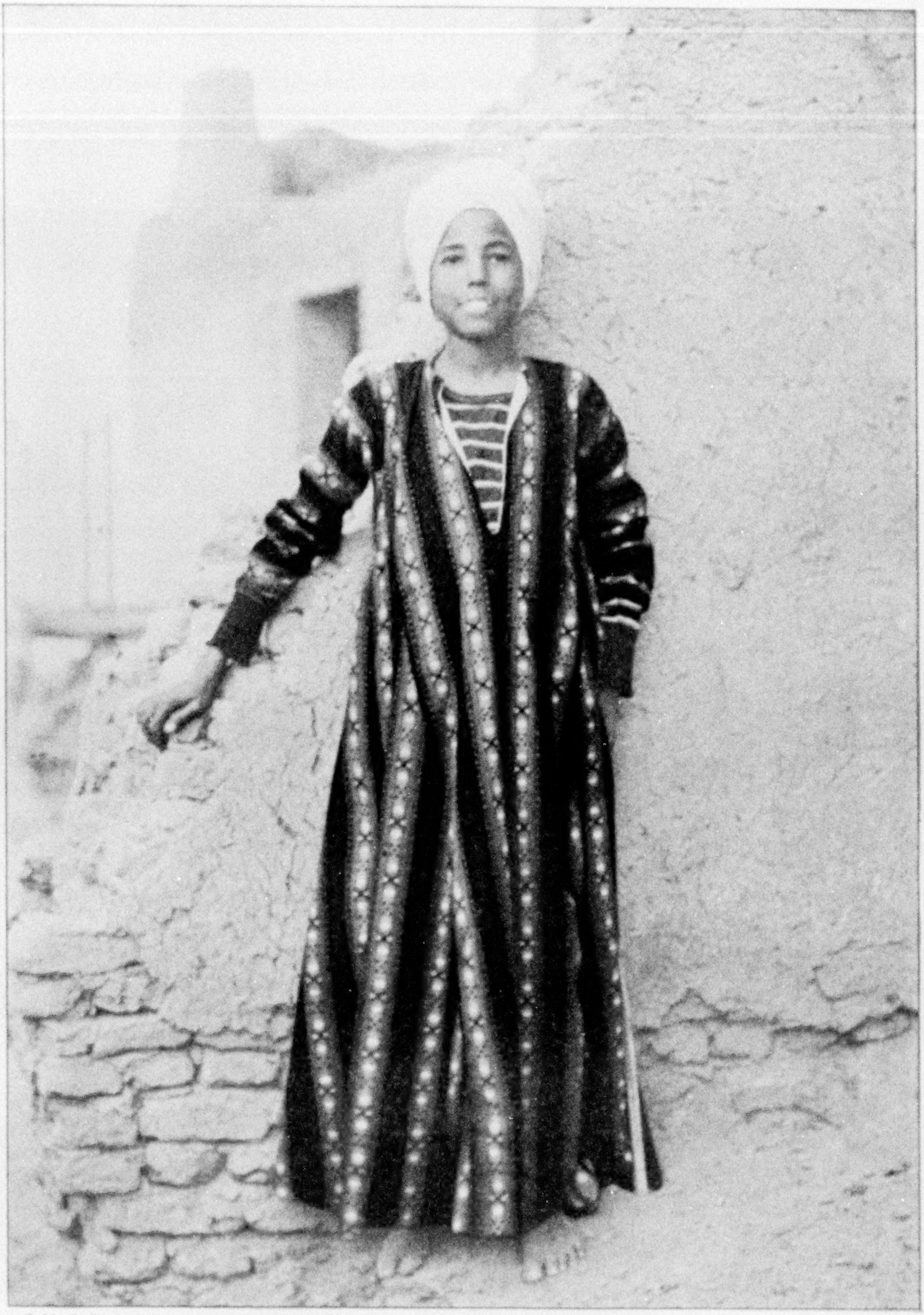
We look over the ridge into the rich Plain of Esdraelon, which, together with its extension, the Valley of Jezreel, intersects the whole of western Palestine. The Haifa-Damascus Railway runs through this depression.

Haifa, a flourishing seaport with some 24,000 inhabitants, is delightfully situated. It lies at the foot of Mount Carmel, on a gentle slope which overlooks both the Bay of Acre and the Plain of Esdraelon—a green vista which stretches to the distant blue mountains of Galilee. Close to the eastern outskirts of the town the river Kishon, one of several limpid streams which water the plain, enters the sea.

ACRE'S BIG NICHE IN HISTORY

Looking northward, across the wide sweep of the splendid sand-belted bay, we see Acre, a white town which juts into the sea like an immense breakwater. The wedge-shaped promontory which the place occupies seems to have been expressly designed by Nature as a site for a stronghold.

Those who remember their history cannot fail to be stirred by the sight of this ancient seagirt fortress. There is probably no town outside Europe which has figured so often in the histories both of England and France.



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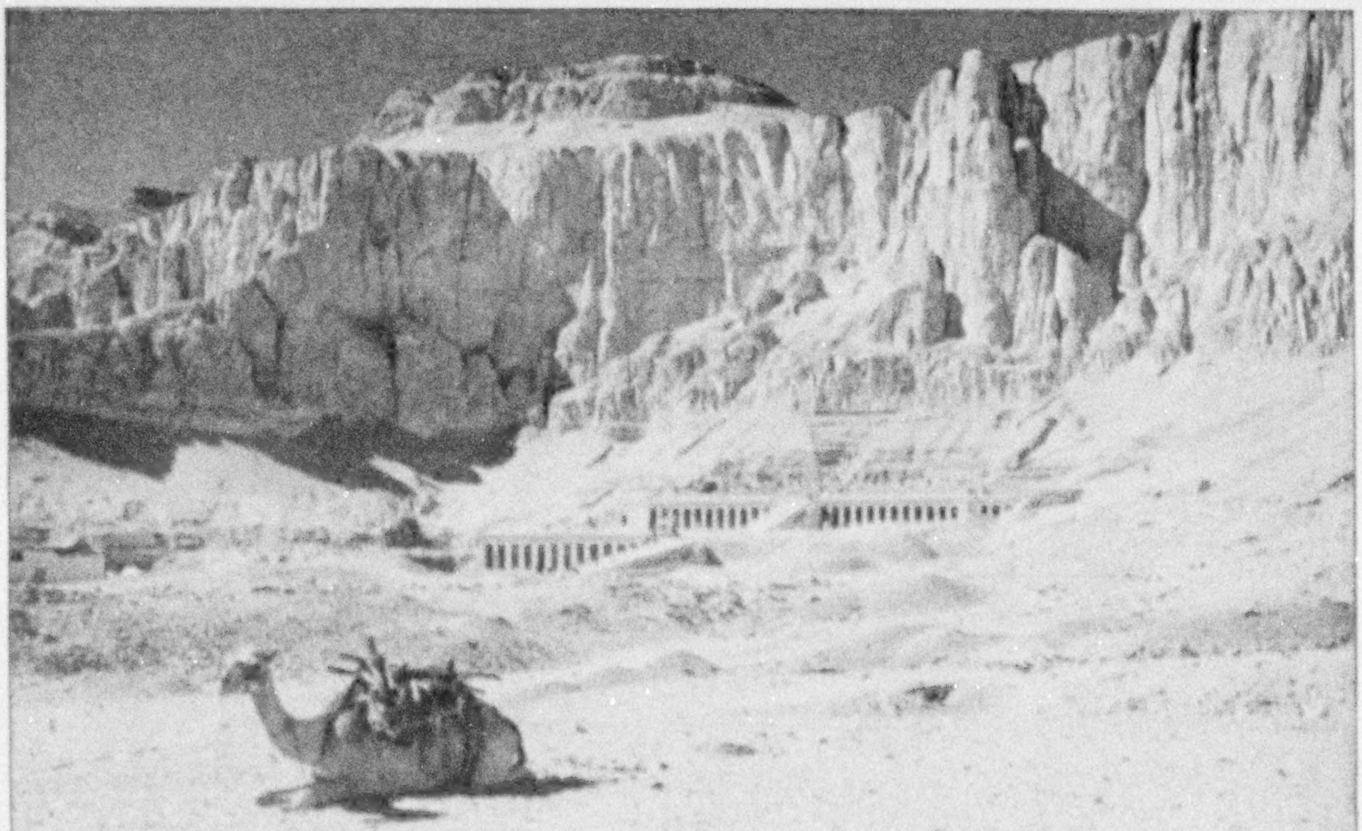
A DONKEY BOY OF UPPER EGYPT

This youngster leads one of the diminutive mounts engaged by tourists who journey to the Valley of the Kings from Luxor. His wages average twenty cents a day, but this sum does not take into account the gratuities bestowed by the pleased traveler.

THE MIGHTY NILE AT CAIRO

The craft in the foreground are cargo carriers, while moored along the palm-lined bank are dahabeahs, the light-draft houseboats so familiar to American tourists.



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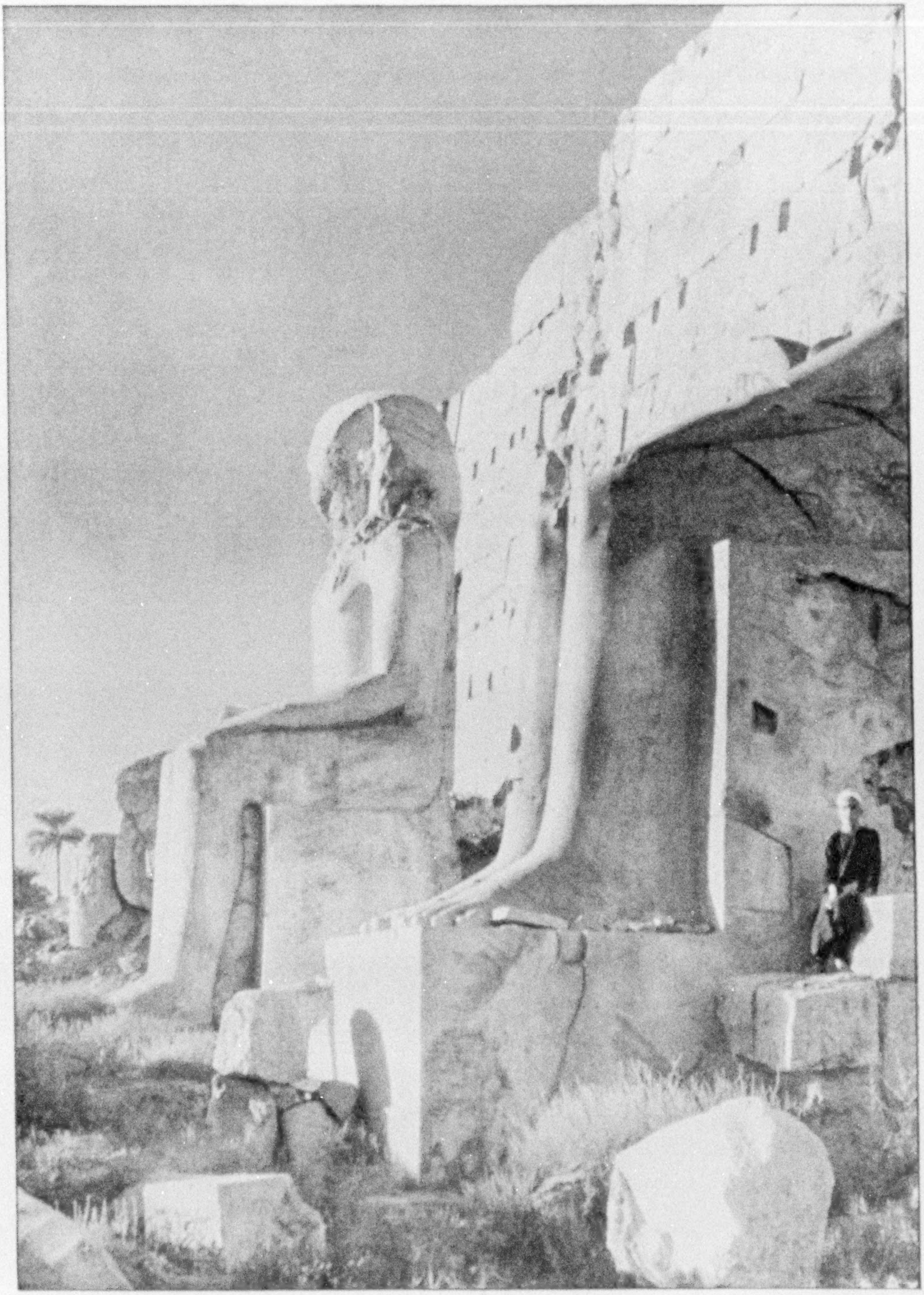
HATSHEPSUT'S TERRACED TEMPLE IN THE VALLEY OF THE KINGS

This majestic tomb-chapel was built in honor of royal personages buried in adjoining sepulchers—Thothmes I, his daughter, the famous Hatshepsut, her brother and consort, Thothmes II, and her successor, Thothmes III. Everywhere on the walls of the temple Hatshepsut engraved and painted pictures illustrating the principal events of her reign. The cliffs in the background rise to a perpendicular height of 400 feet.



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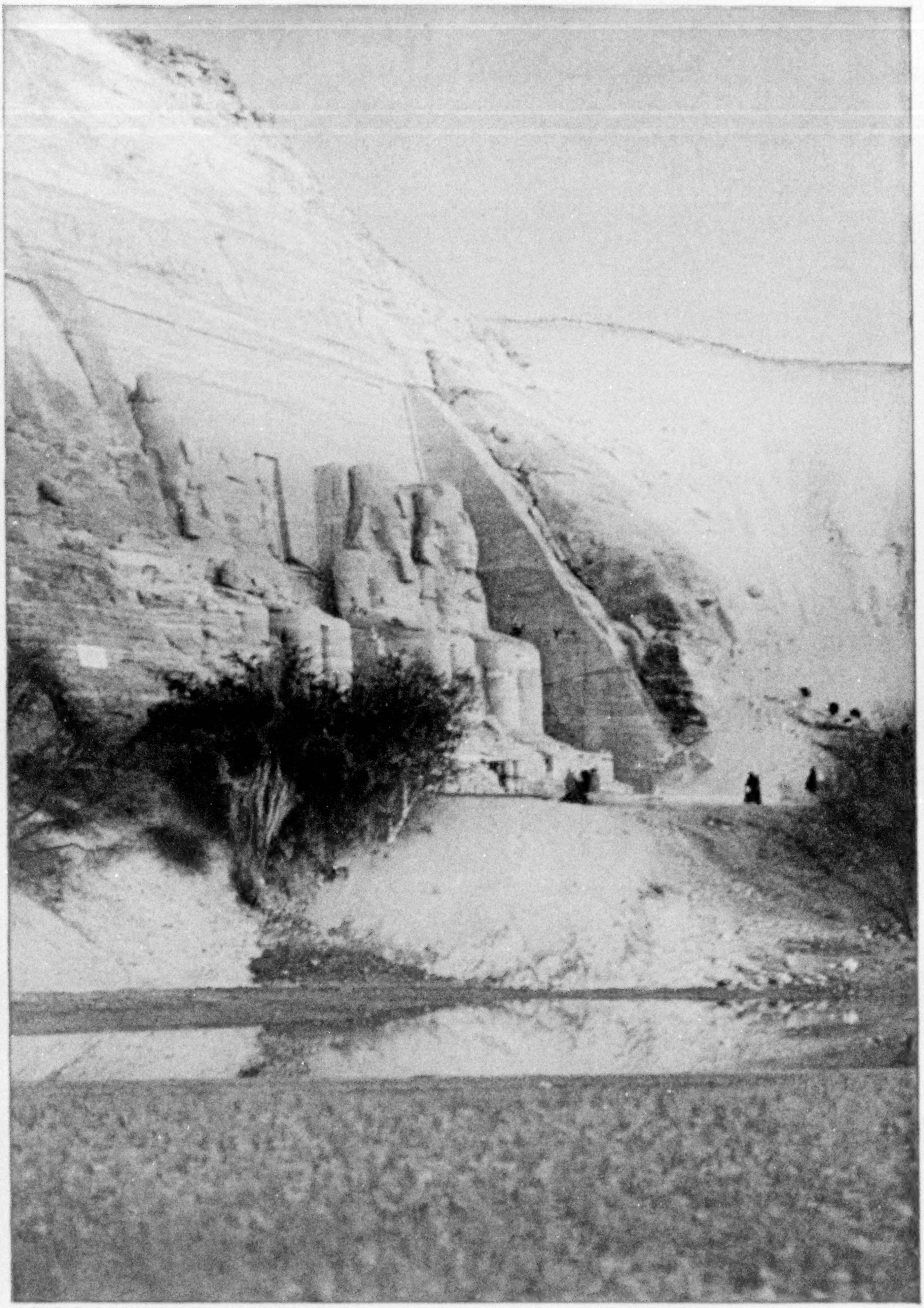
OLD GLORIES LONG SINCE TURNED TO DREAMS

The village of Karnak, where the ruins of these colossal statues are located, may have received its name, which signifies "window" in Arabic, from the conspicuous position of the great windows of the Hypostyle Hall of the Temple of Ammon. This Hall of Columns, one of the most amazing feats of Egyptian architecture, was built largely by King Horemheb (B. C. 1350-15) and finished by Rameses II.



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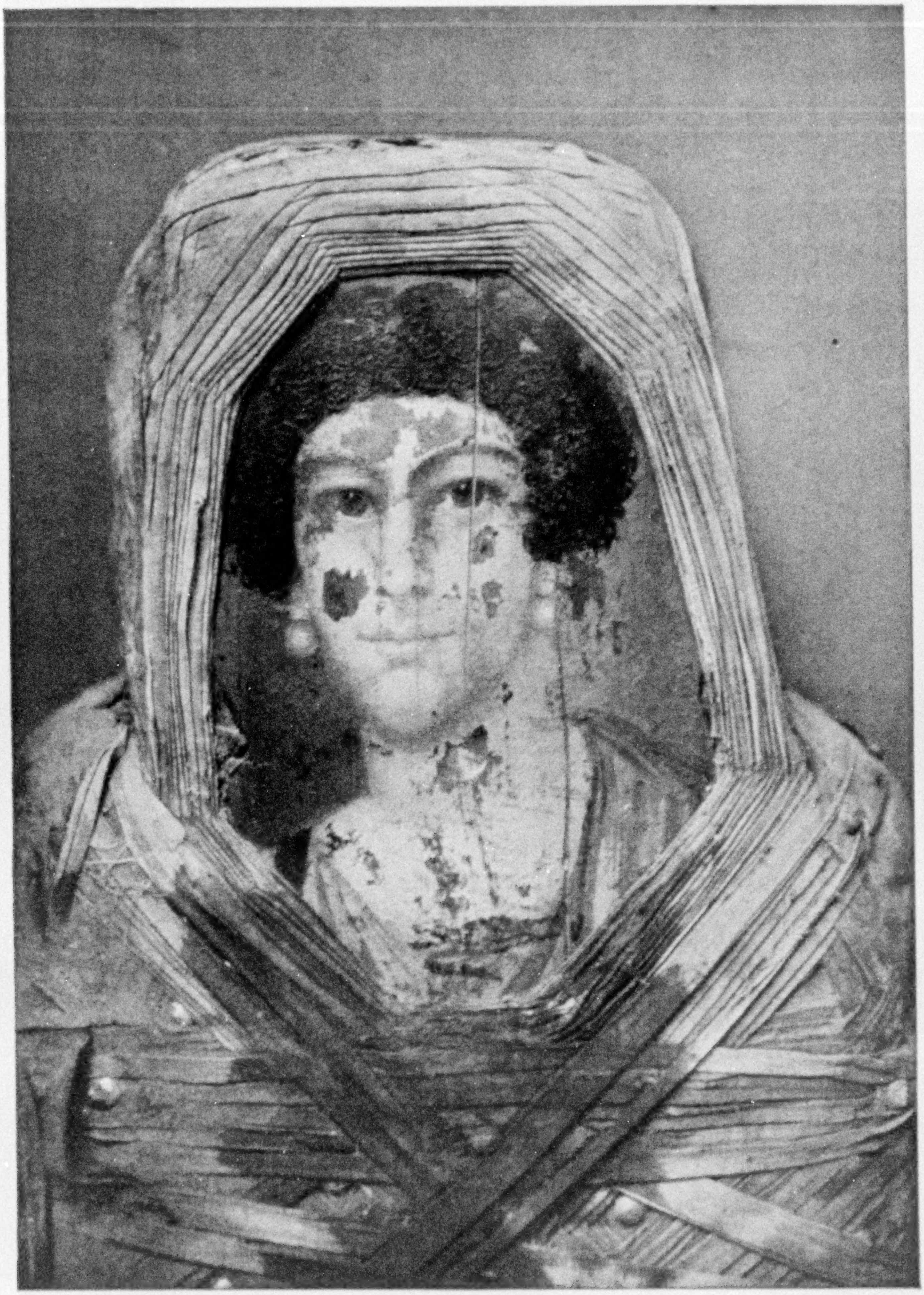
IMAGES OF RAMESES II CARVED IN THE ROCK AT ABU SIMBEL

The vast rock temple of Ra-Harmachis is largely the work of Rameses II. This widely advertised Pharaoh suffered from a "Narcissus" complex. Like the beautiful youth who became enamored of his reflection in a woodland pool, so fond was Rameses of his own likeness that he set it up in stone throughout the length and breadth of Egypt.



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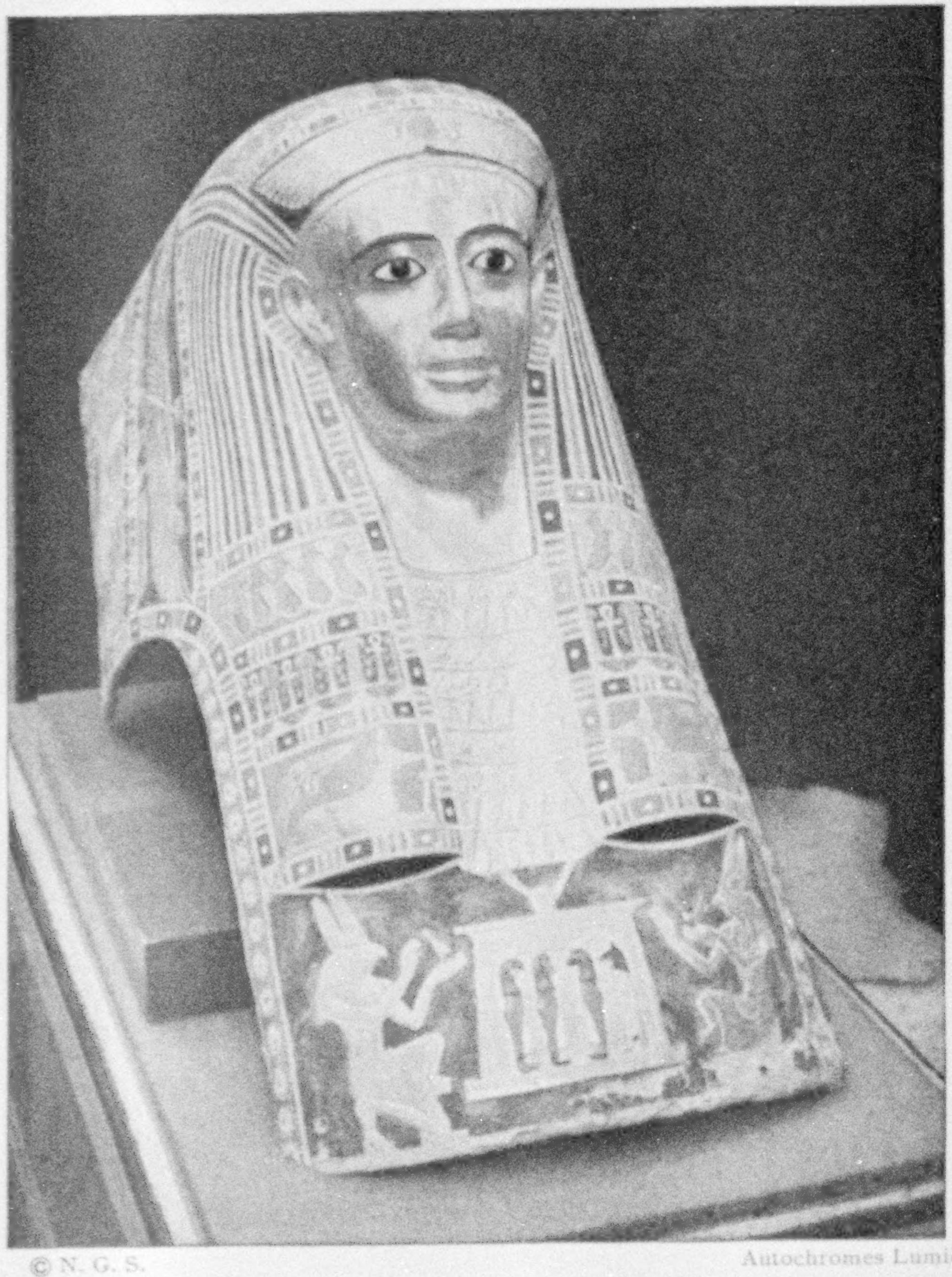
A FACE THAT HAS WITHSTOOD THE RAVAGES OF TWENTY CENTURIES

Like the fame of Cleopatra, this wax painting on a sarcophagus of the Ptolemaic epoch, has survived the onslaughts of time. It is a relic of the days when Greek influence was strong in Egyptian art, but such features are still to be found among the women in the Land of the Nile. The wrappings of this mummy are of fine linen.



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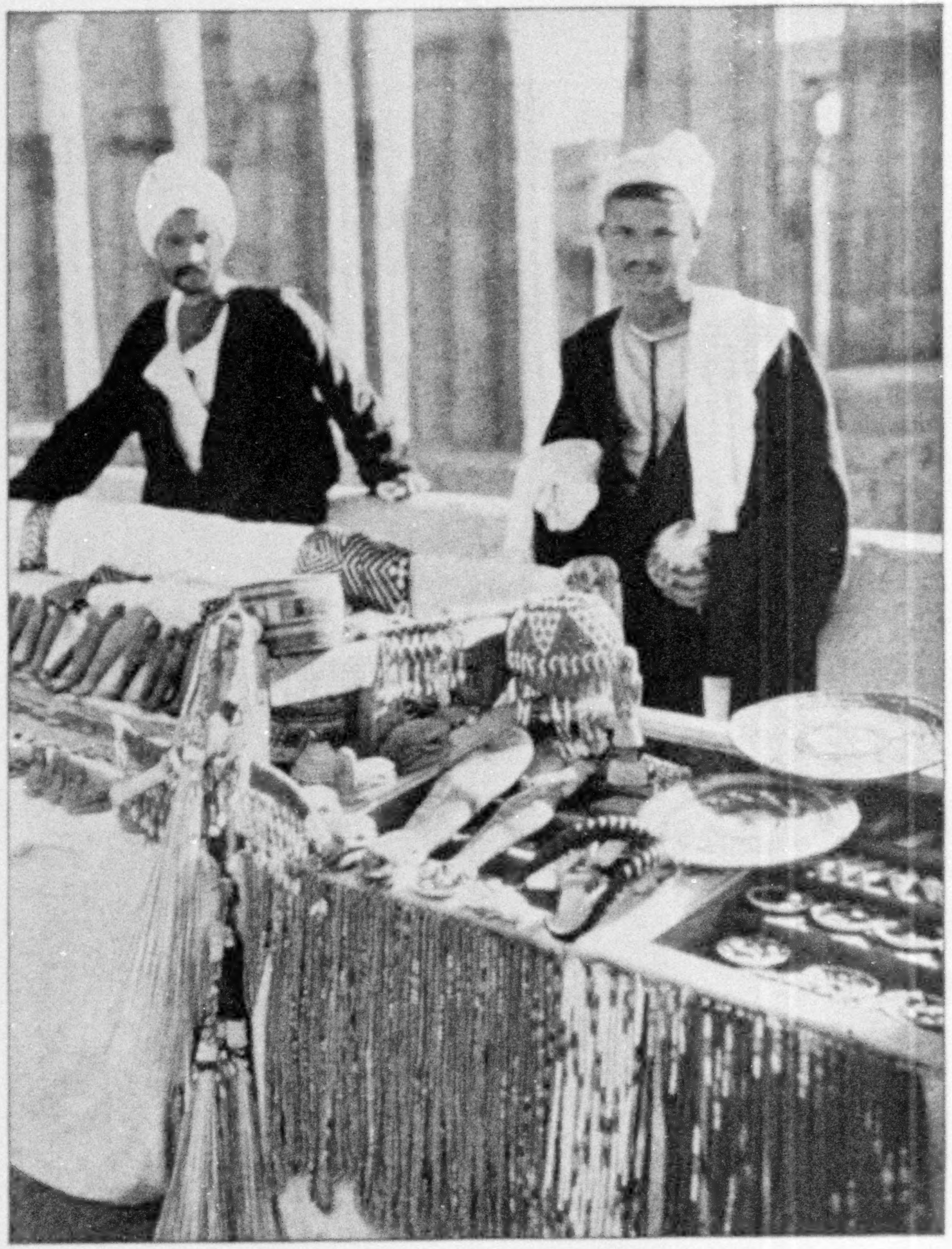
AN ANCIENT MUMMY COVERING

The mummies of royal and noble Egyptians were inclosed in several coffins, the innermost being carved in the likeness of the deceased. Note the pictures of early Egyptian gods at the base of the covering.



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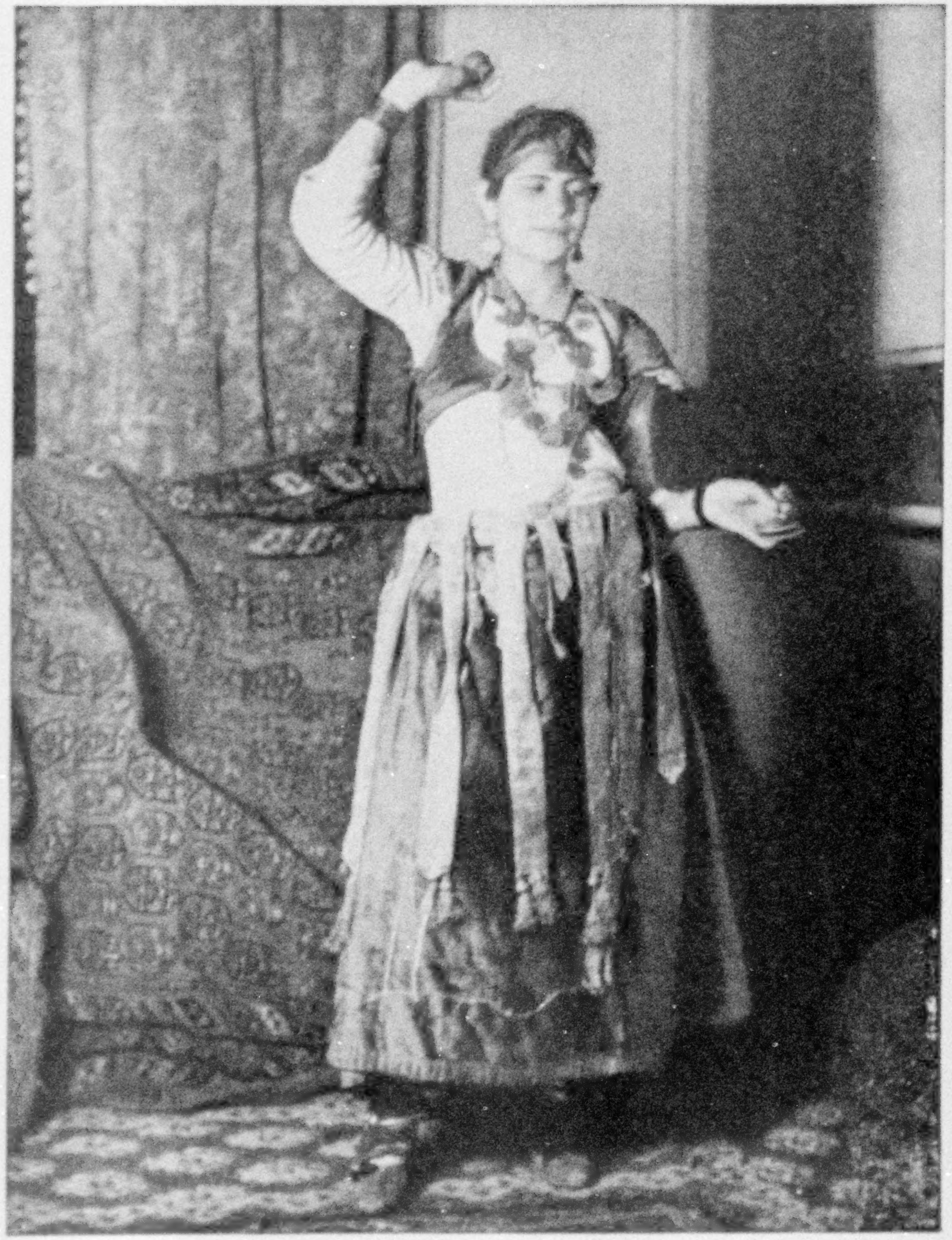
TRADING ON THE ANCIENTS

Cairo, like tourist centers the world over, is plentifully peopled with souvenir sellers. This particular display includes beadwork, woven straw, glass and brassware, and mummy models.



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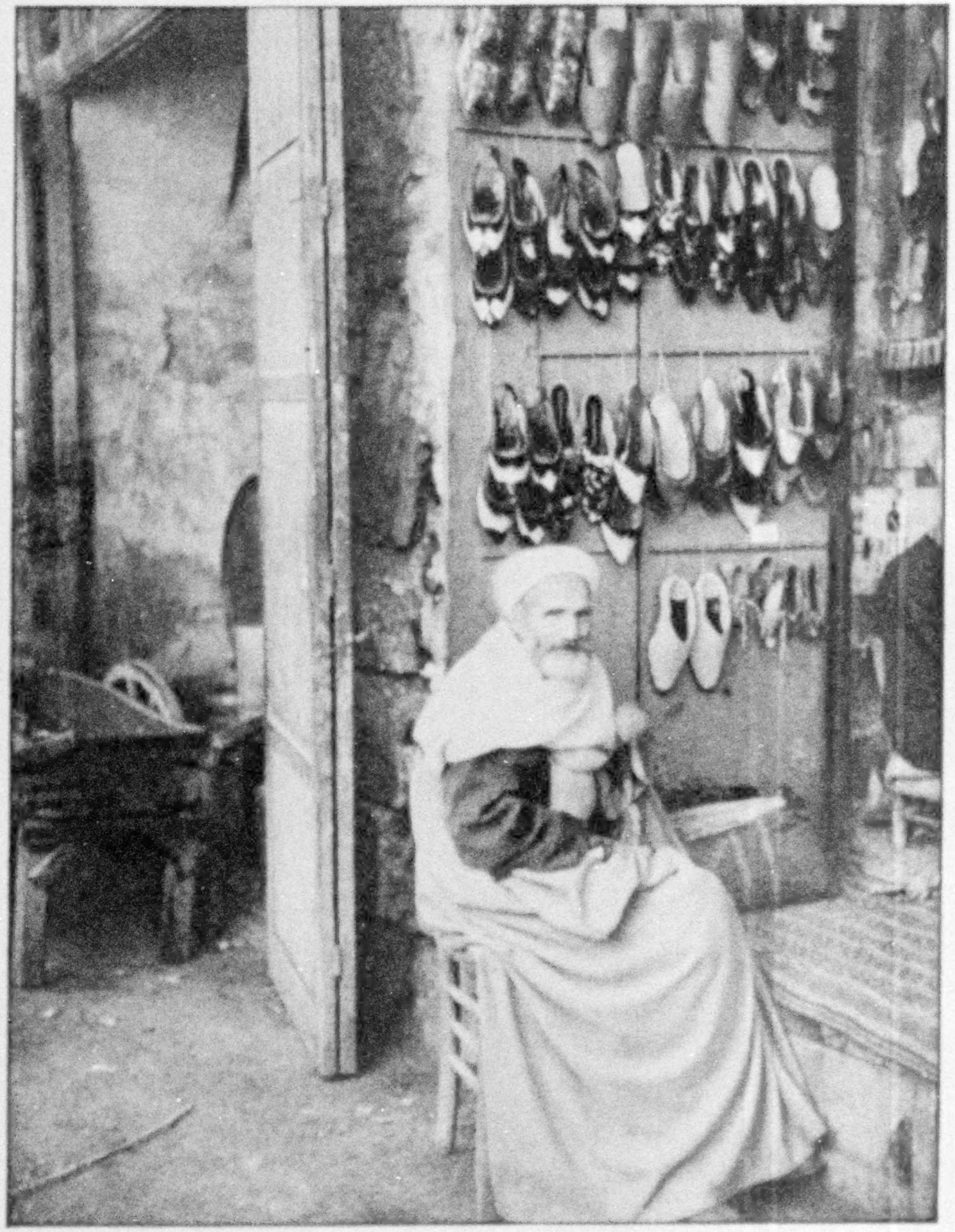
A YOUNG CABARET DANCER



A VENERABLE VENDER OF SHOES

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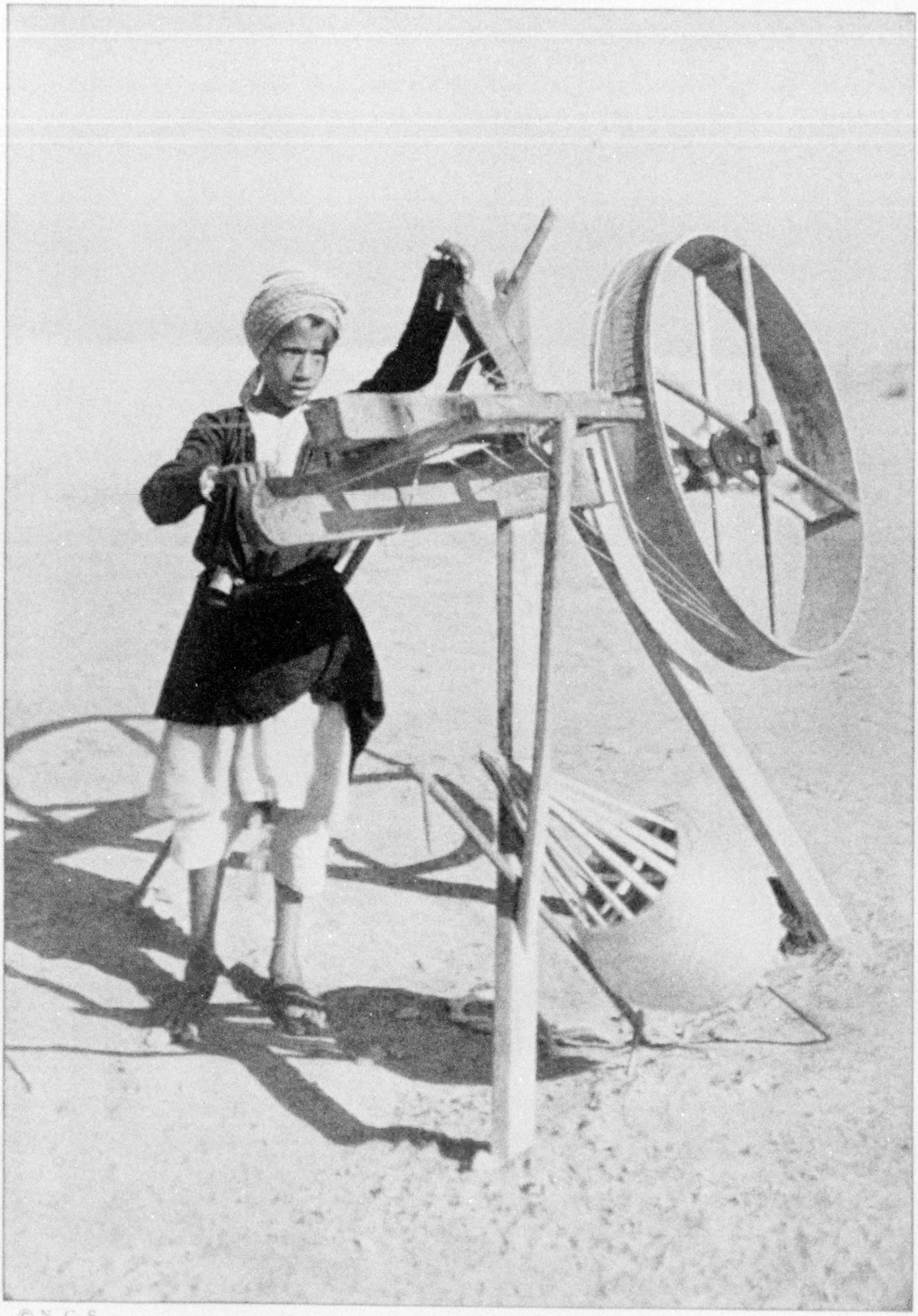

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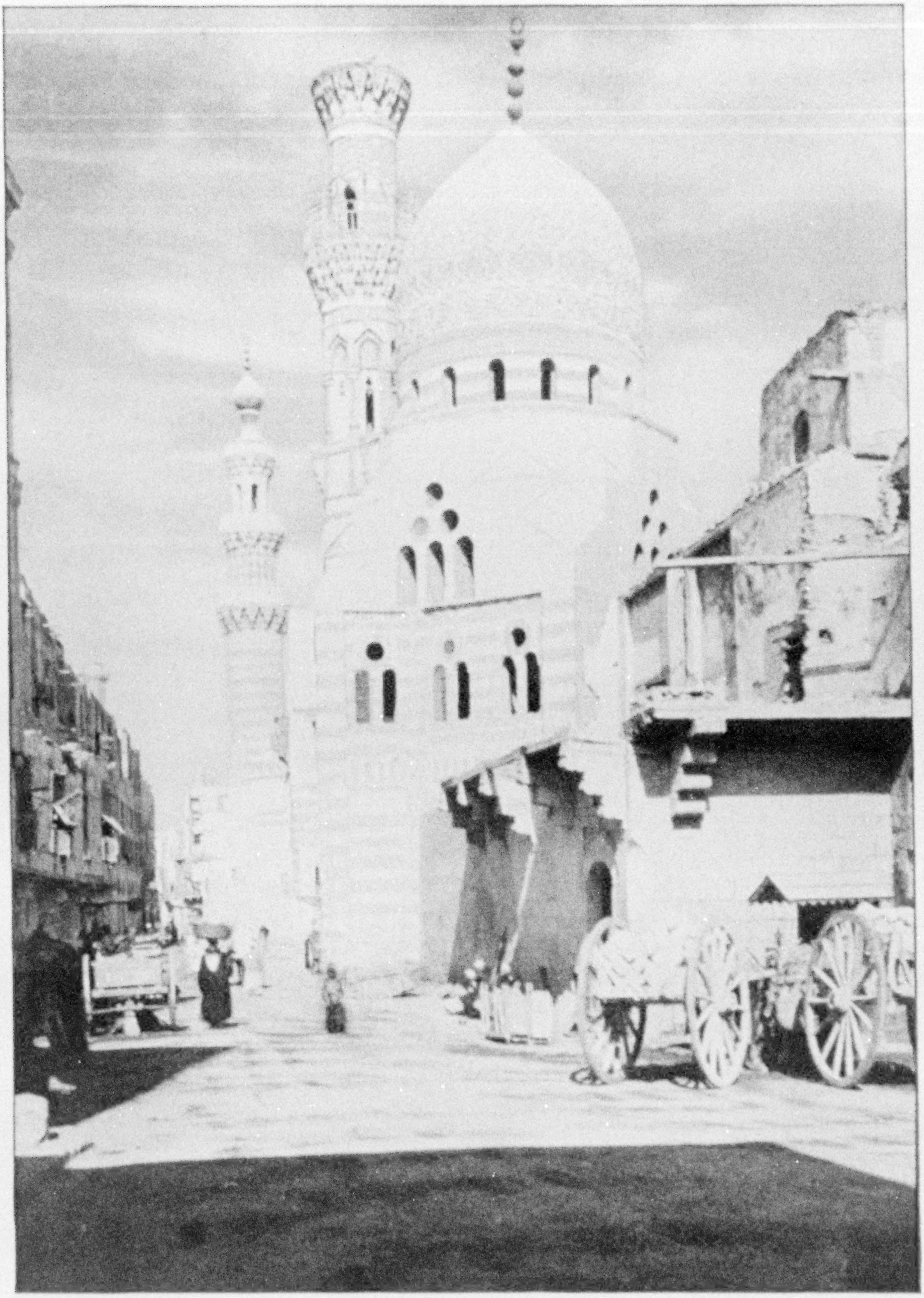
REELING OFF SILK NEAR CAIRO

This method of spinning silk was formerly common in Egypt, but hand operations have given way in large measure to machinery. The silkworm is cultivated extensively along the Nile, and the fiber produced is of extraordinarily fine quality, soft as chamois but very strong.



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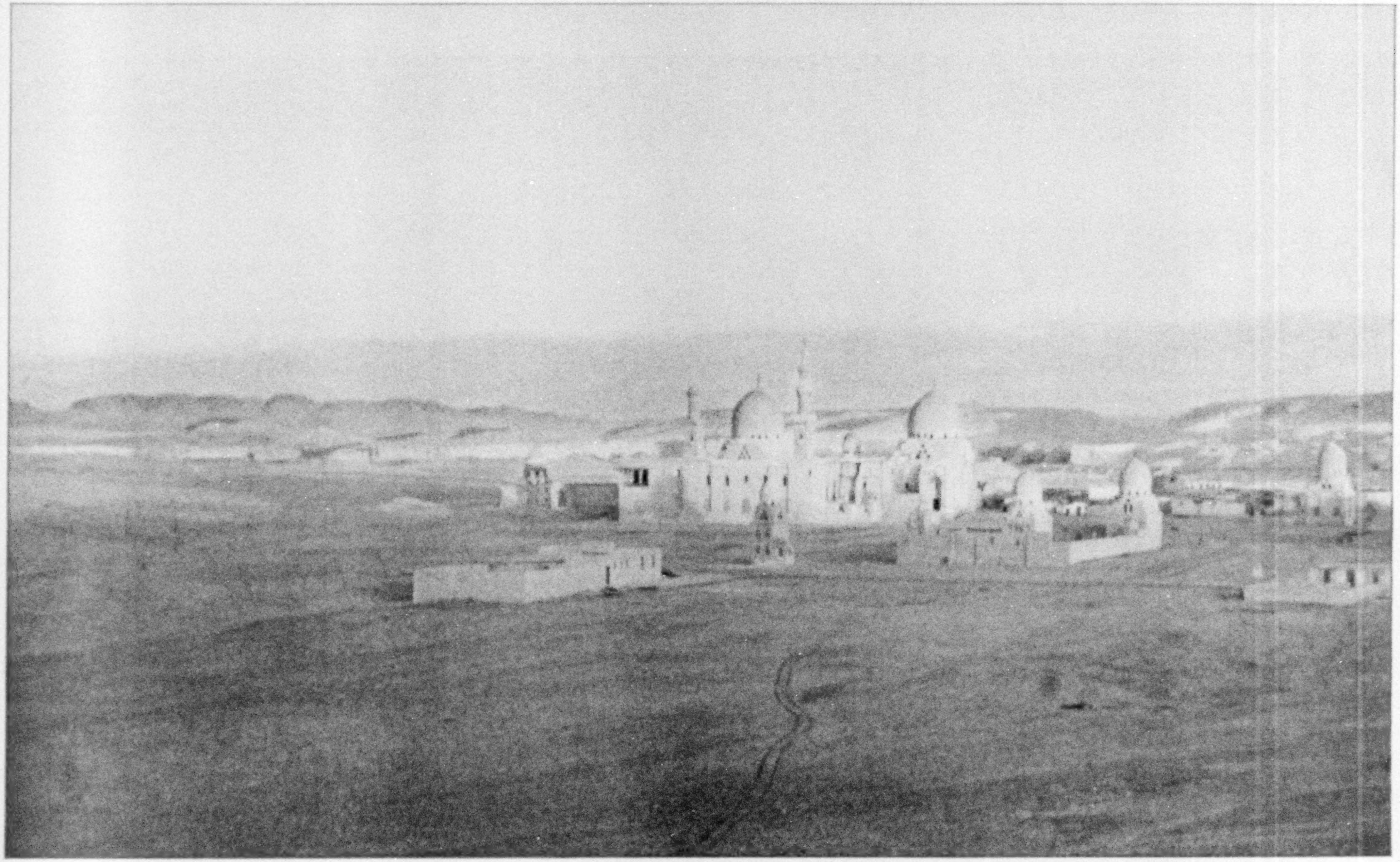
THE BLUE MOSQUE OF IBRAHIM AGHA

The picturesque place of worship, built by the Emir Aksunkor in 1346, is distinguished by the exquisite blue tiles which cover nearly its entire eastern wall to the level of the windows. It was restored by a Turkish governor some 300 years after its erection and has retained his name.



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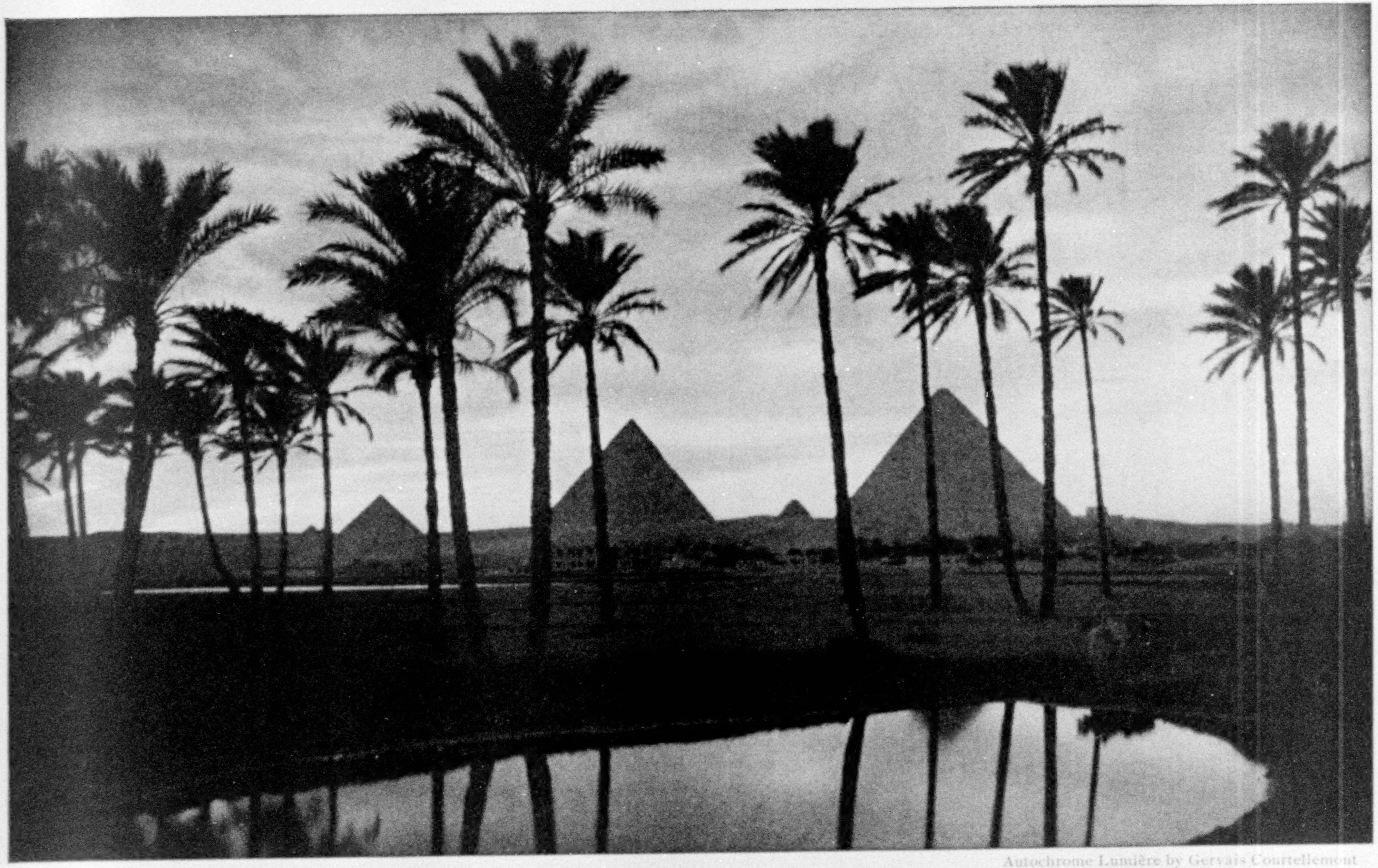
THE MOSQUELIKE TOMBS OF THE CALIPHS, NEAR CAIRO

While many of Egypt's ancient rulers, the Pharaohs, were buried in the Valley of the Kings, opposite Luxor, her medieval Arab conquerors were entombed here, along the east side of the capital city. The mausolea were erected chiefly by the Circassian Mameluke sultans.



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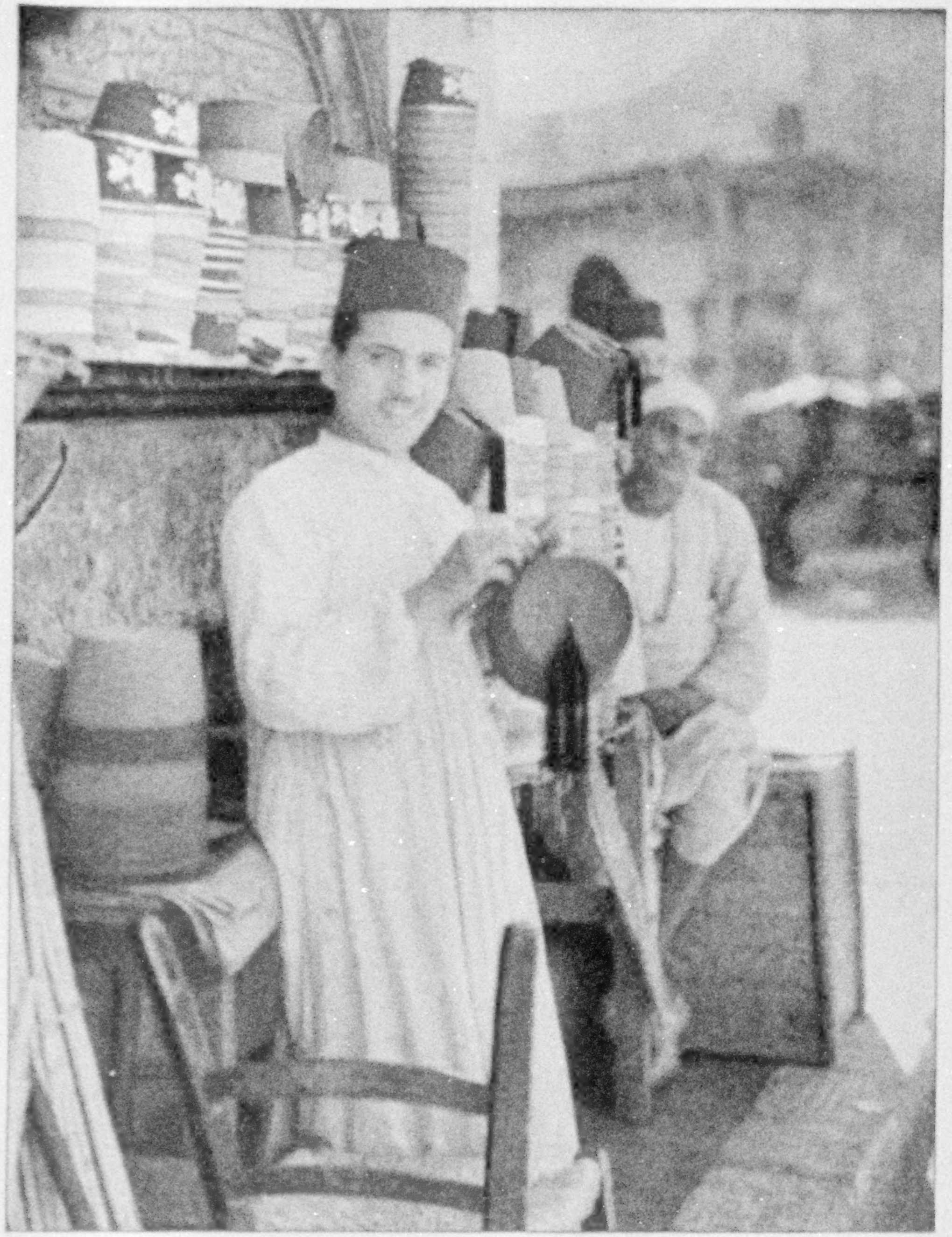
CONQUERORS OF TIME—THE CHANGELESS PYRAMIDS



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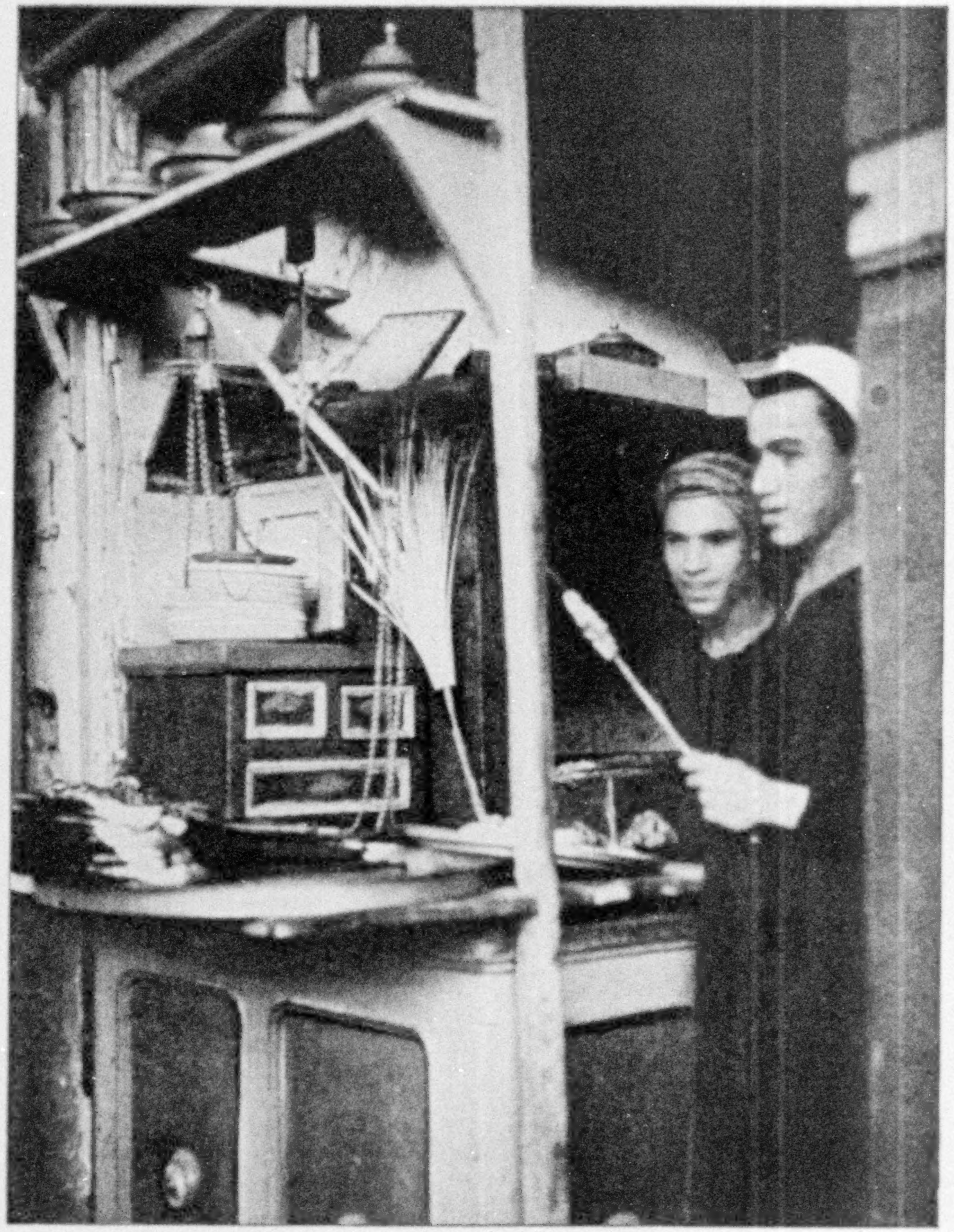
A NATIONAL INSTITUTION—THE TARBOOSH

Nearly everyone in Egypt except the *fellah* (peasant) wears the *tarboosh*. It is light in weight, usually dark red in color, and of two parts, an outer covering of felt over a crown of finely woven straw. The straw lining and the color of the felt make it resistant to heat. The tassel is both an ornament and a handy weapon for chasing flies.



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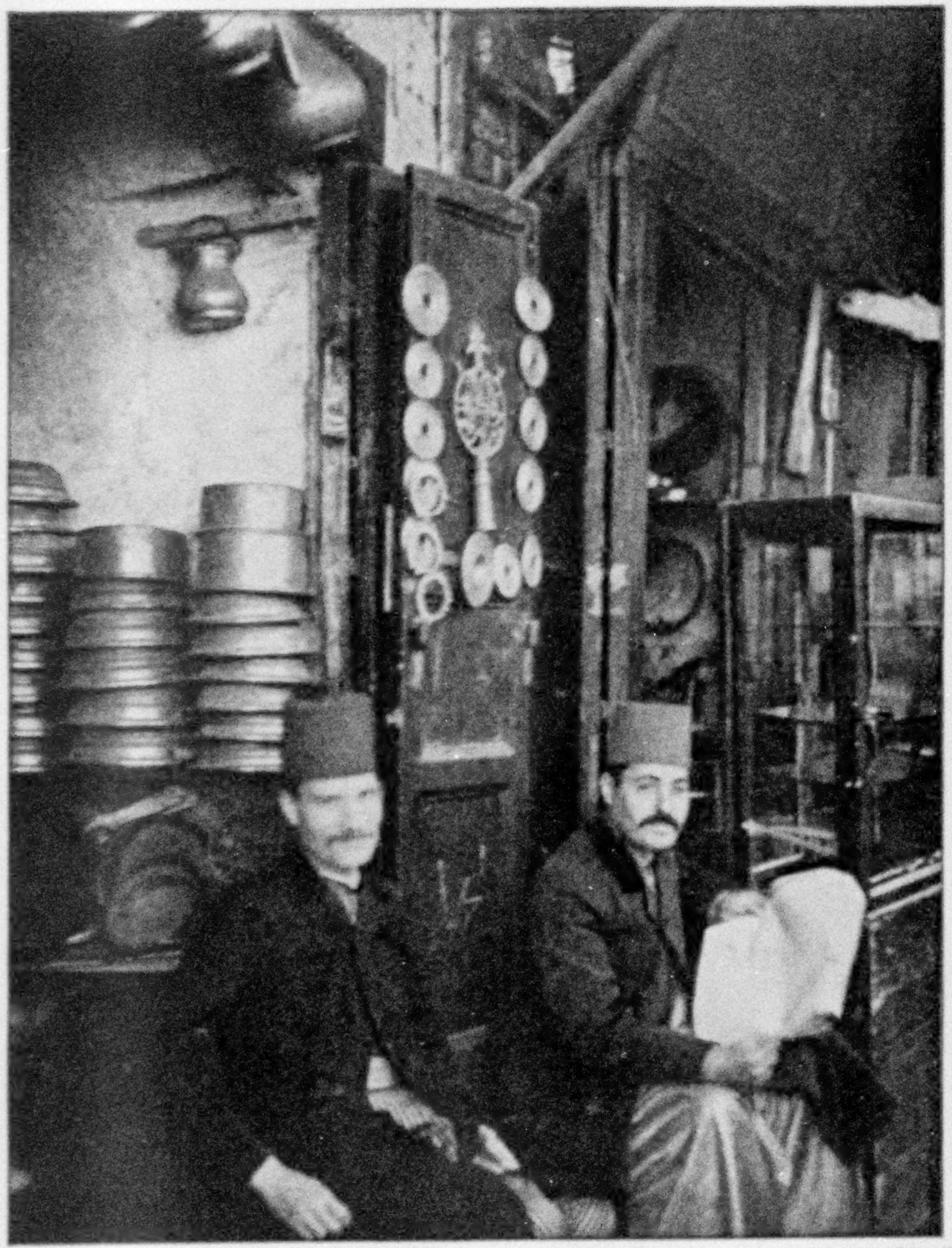
THE POOR MAN'S MEAT SHOP

The Egyptian's method of cooking lamb and mutton resembles the Persian's. The meat is first cut into small chunks, boiled for a few minutes, then spitted on a skewer, lean and fat pieces alternating. When cooked over hot coals for twenty minutes this will tempt the most jaded native appetite.



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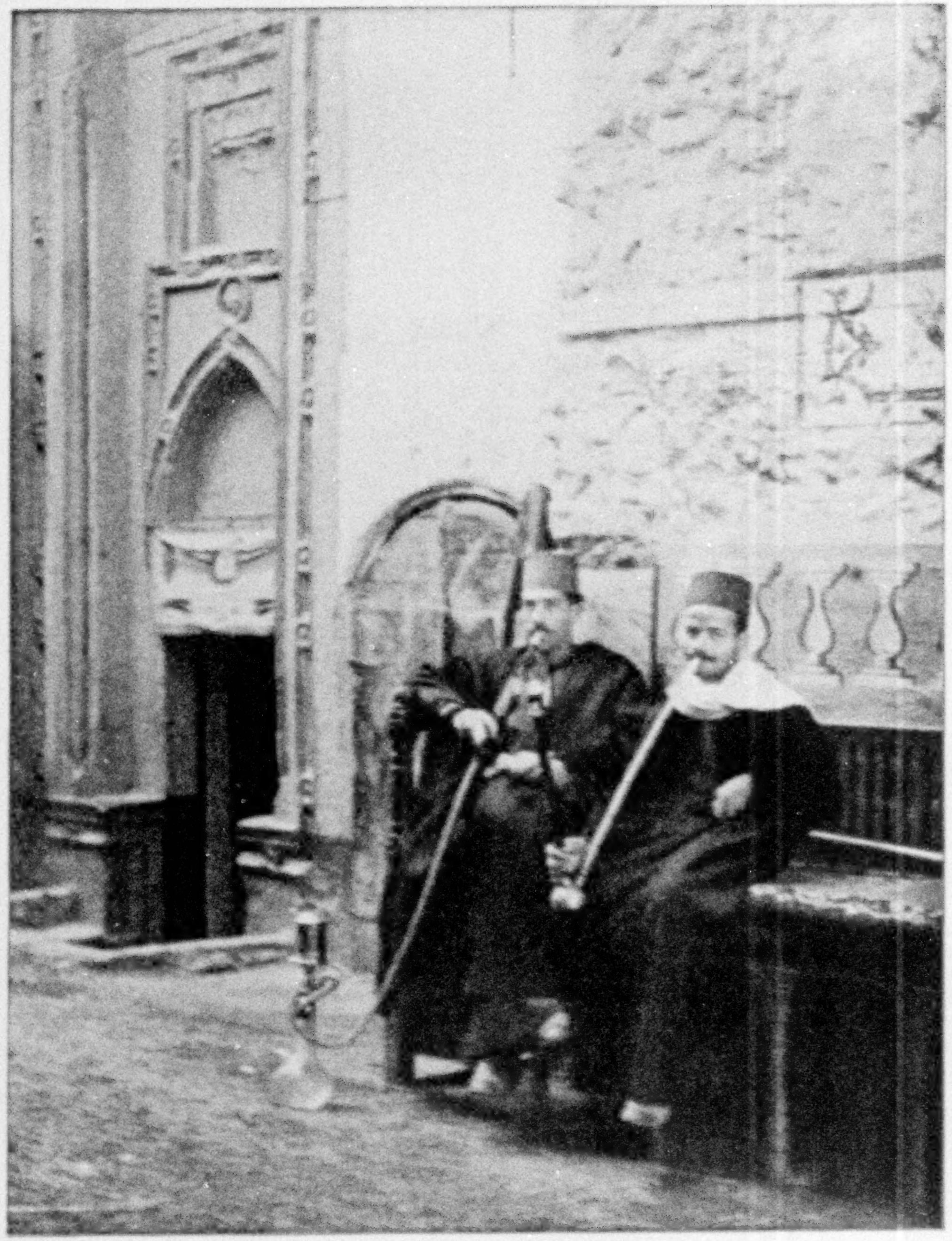
DISPENSERS OF COPPERWARE IN EGYPT'S CAPITAL

The Egyptians use copper extensively, often in place of iron and steel. Arabic designs and figures adorn many of their utensils. Even keys and locks usually bear some sort of decoration. The fancy copper piece in the center is a flagstaff design.



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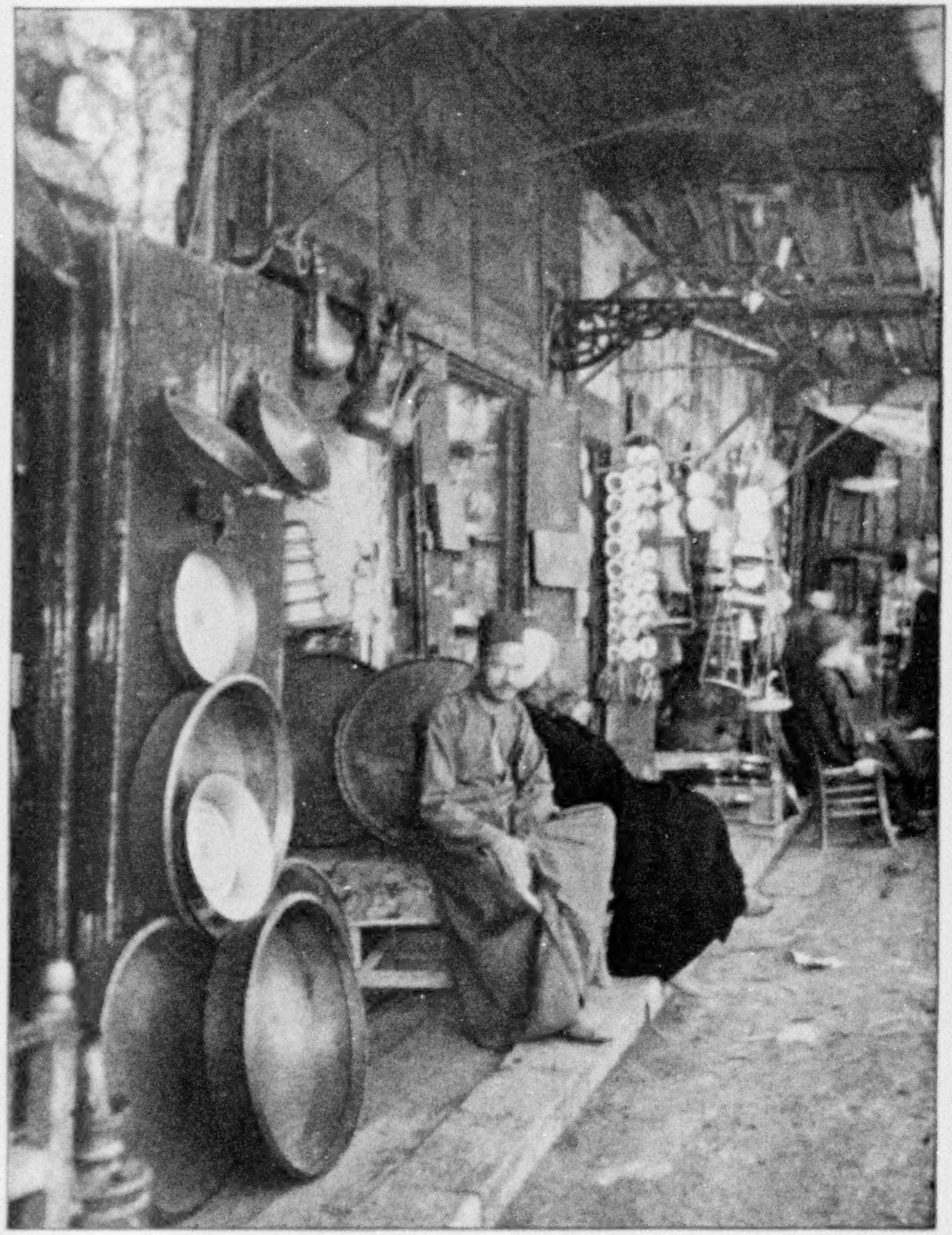
A PIPE AND A CHAT ON THE STREETS OF CAIRO

These gentlemen of leisure are enjoying the luxury of water pipes, the one on the left smoking a *nargile*, the other a *gozeh*. They are in native dress, indicating that they are probably artisans, rather than professional men, as the latter usually wear European clothes nowadays.



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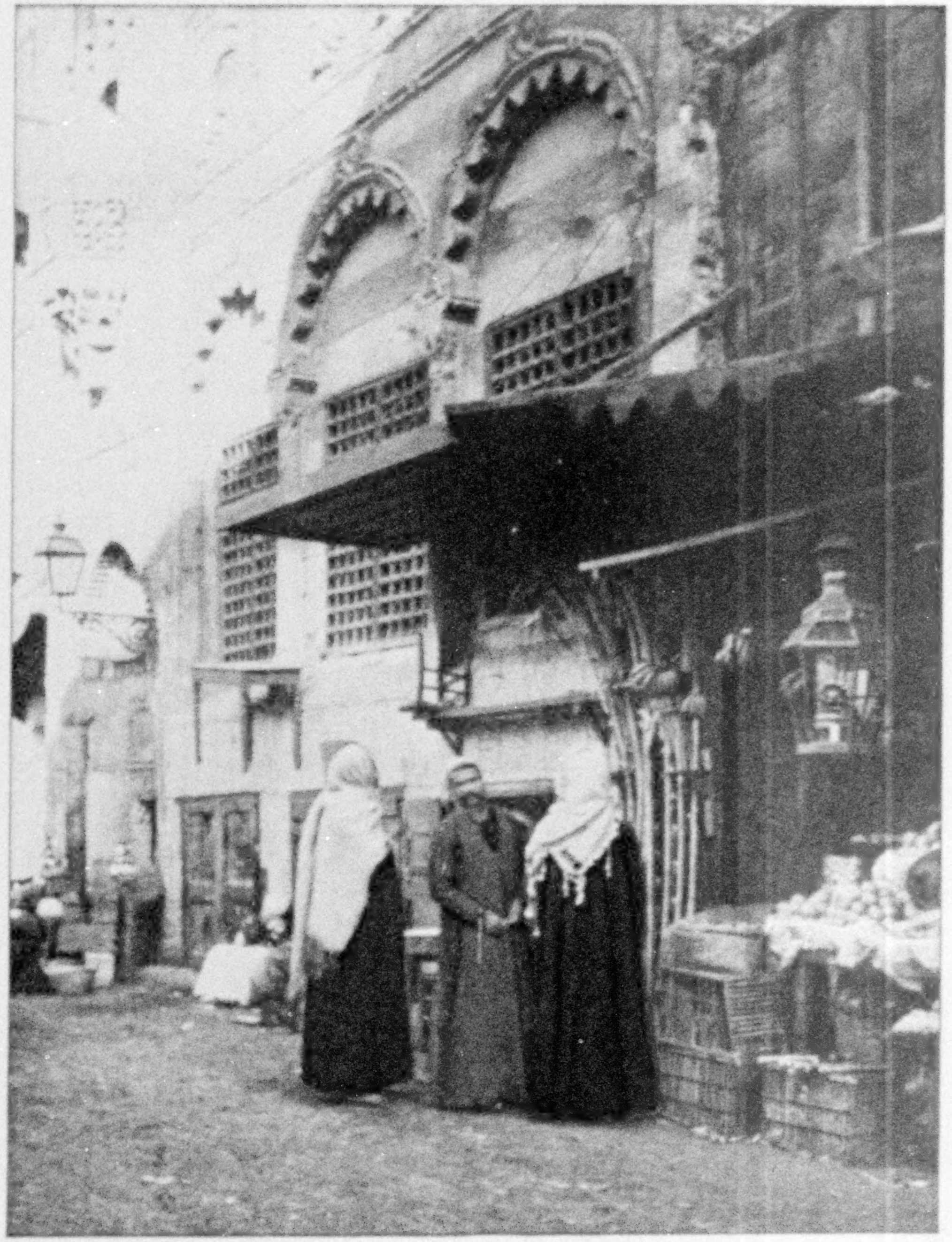
DEALERS IN HOUSEHOLD UTENSILS

The large receptacles in the foreground are the Egyptian versions of the family washtub. These vessels are made of copper, practically all of which is imported.



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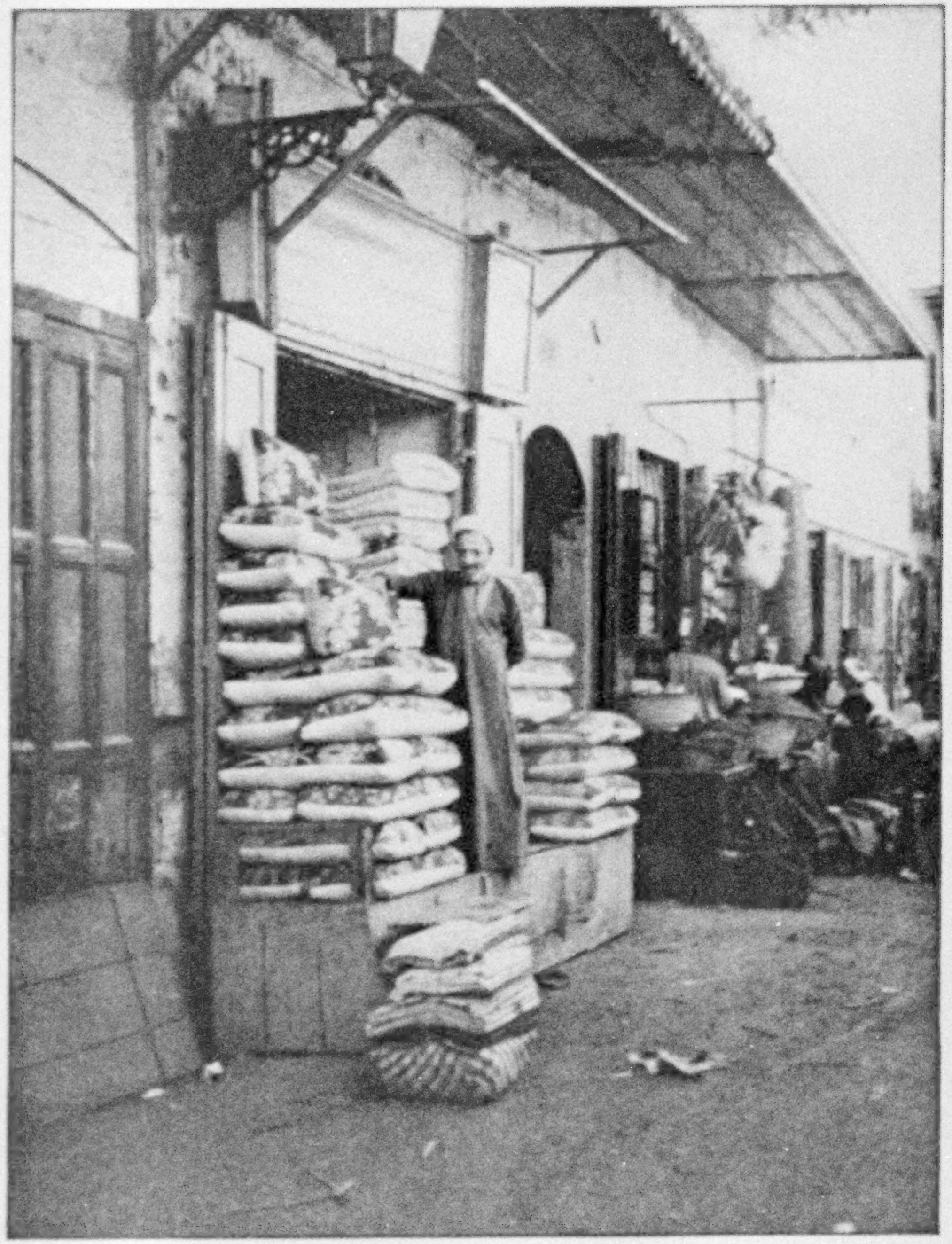
A HOME-GROWN FRUIT STAND IN CAIRO

A few dozen oranges, some bananas, and a little sugar cane constitute the merchant's entire stock. His profits seldom exceed a dollar a day.



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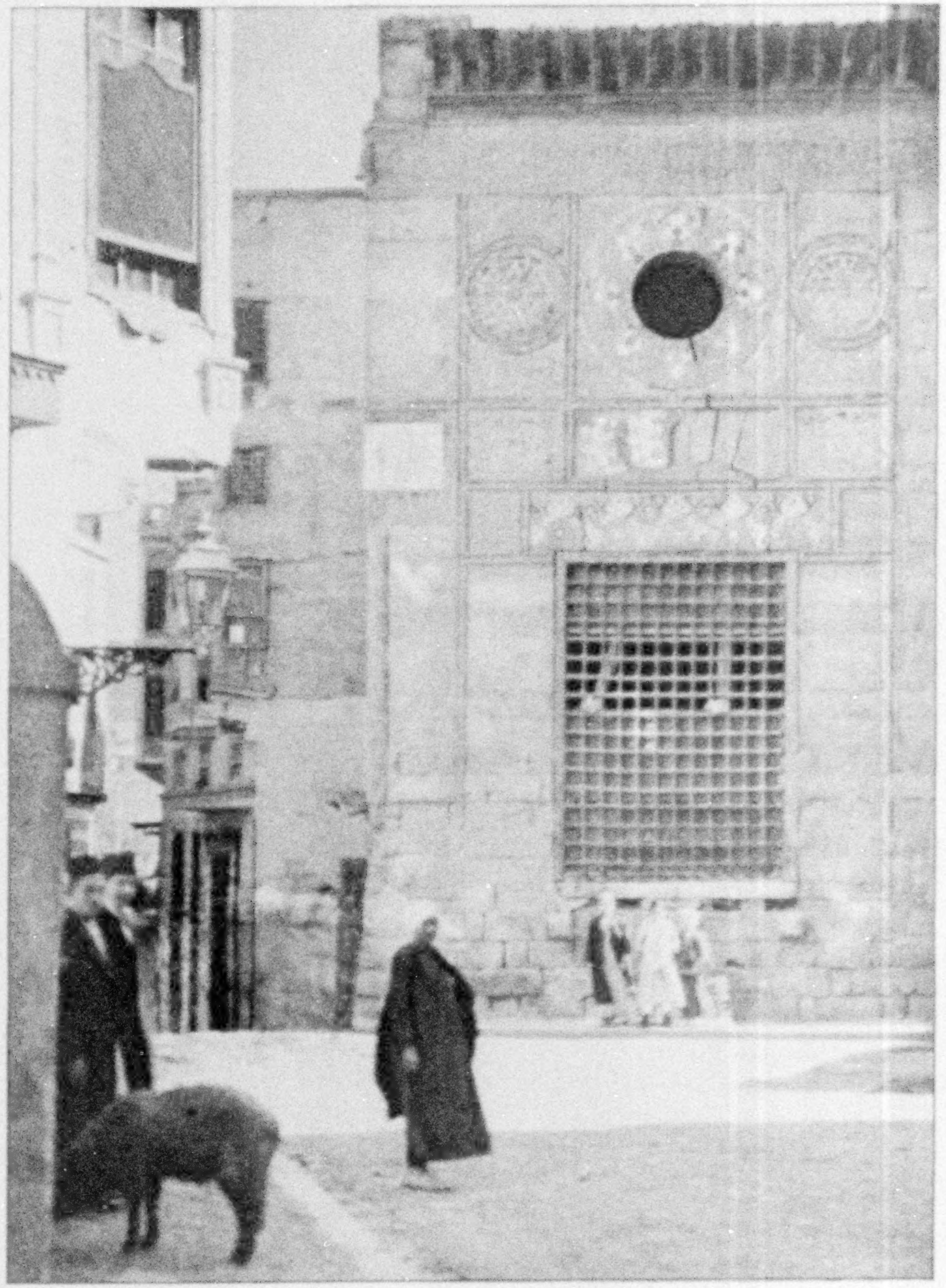
A HARD BARGAINER IN SOFT GOODS

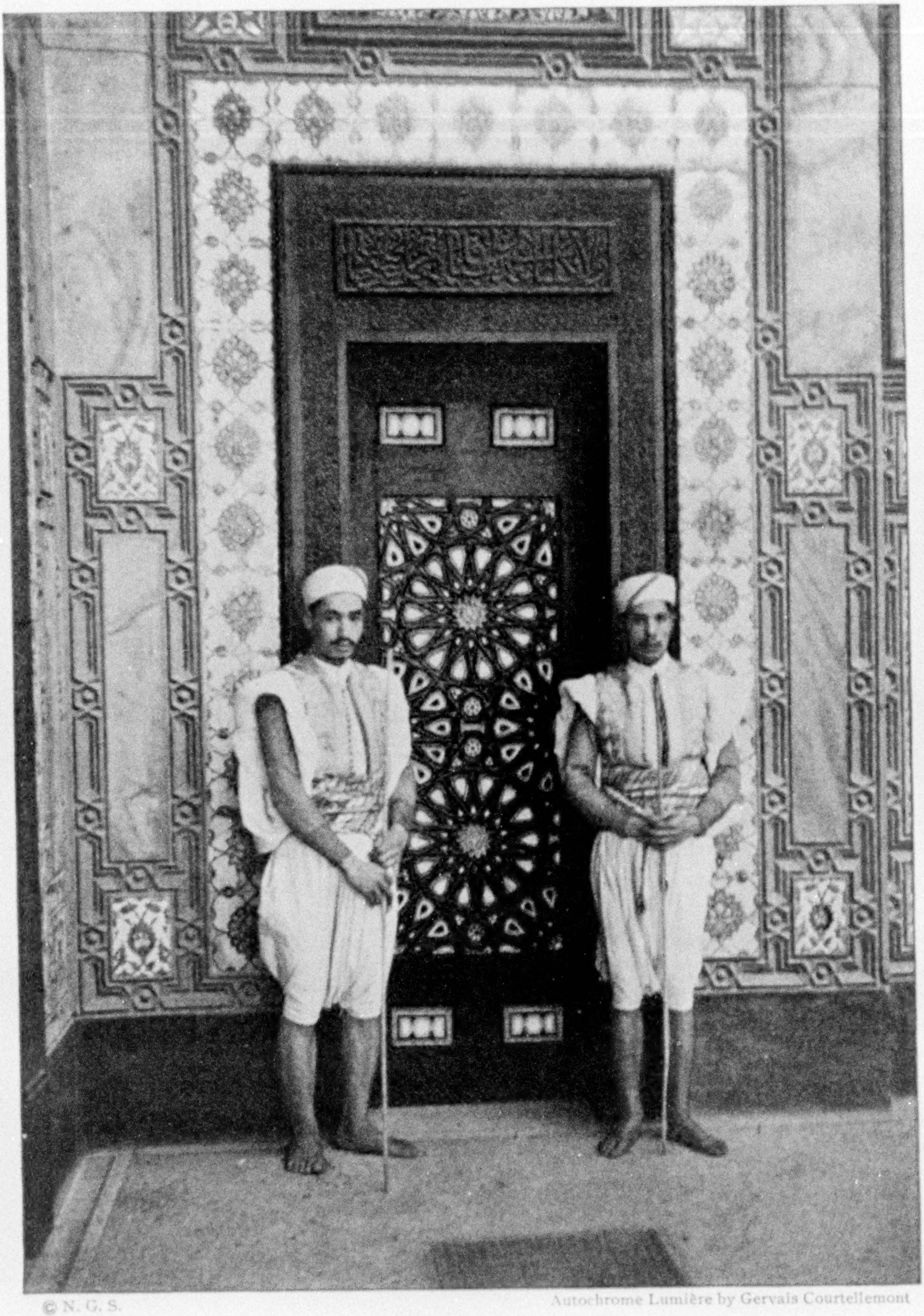
Cotton-filled quilts and cushions are used extensively by middle-class Egyptians. The tiny shops in the older parts of Cairo are little more than caves in the wall.



Autochromes Lumière by Gervais Courtellement

WHERE CAIRO'S ARISTOCRACY ONCE DWELT

Many winding streets of old Cairo retain the oriental aspect that has somewhat departed from the new city. Occasional beautifully carved stone decorations bespeak a happier day in the past.



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Autochrome Lumière by Gervais Courtellemont

A MASTERPIECE OF EGYPTIAN ARABESQUE

The entrance to the French Legation in Cairo, with its porcelain tile and ivory inlay, is a fine example of the Egyptian arabesque style. The *sais* standing at either side are survivors of an old régime when such brightly costumed servitors ran before the carriages of all people of consequence to clear the way.

It was first captured by Crusaders, mostly French and English, some eight centuries ago. Successive generations of these soldiers of the Cross held it for a period of 77 years; it was then taken by Sultan Saladin. Four years later it was recaptured by Richard Cœur de Lion and Philip Augustus of France, after a two years' siege and at a cost of 100,000 men.

The town was subsequently handed over to the Knights of the Order of St. John, who held it against all comers for a century.

Acre's next appearance in European history was in 1799, when Sir Sidney Smith defended it successfully against Bonaparte, and thus helped to shatter that great adventurer's dream of founding a mighty empire in the East.

In 1840 Acre was bombarded and taken by a combined English, Austrian, and Turkish fleet. In 1918 it surrendered without a struggle to Allenby's cavalry.

These are but a few of the vicissitudes through which the town has passed; its long story—the place dates from Phœnician times—is a record of almost continuous strife. But its martial days are over, for it is no longer a stronghold. Its position, once so nearly impregnable, now renders it peculiarly vulnerable to modern artillery fire and to aircraft attack.

FLYING OVER THE SEA OF GALILEE

Acre marks the limit of our flight northward. We now turn southeast, to glance at Lake Tiberias, the Biblical Sea of Galilee. This sheet of water, 13 miles long by 6 broad, is some 680 feet below the level of the Mediterranean. Seen from the air, it is blue-green in color. Its northern and eastern shores are bare and rocky, but on its western side the country slopes gently to the water's edge and is for the most part very fertile.

The color of the Jordan when it flows into Galilee, at its northern extremity, is brown, but the river leaves the southern end as a clear blue stream. Dotted round the lake, but mostly on its western shores, are numerous villages and little towns, pretty to look down on, with their flat roofs, pearl gray color, and borders, on three sides, of gardens or grass-clad slopes. Although insignificant in appearance, the names of several of them—Tiberias, Bethsaida, and Capernaum—are known throughout the world.

From the Sea of Galilee to Damascus ("The Pearl of the Orient") is only 60 miles, as the airplane flies—a mere half hour's flight. But we have yet to visit Jerusalem and the Dead Sea region and probably land to inspect the former. Damascus is an extensive city, and if one wishes to visit it by air from Cairo one should set aside a day for the purpose and make an early start. A better method is to spend the night at Jerusalem and fly to Damascus next day.

There are several interesting places to see on the way down to Jerusalem from Galilee. Nazareth, where the greatest figure in history grew to manhood, is only a few minutes out of our course. To-day it is a fair-sized town, perched high up on the slopes of the Galilean hills overlooking the Plain of Esdraelon. It contains several churches and a number of large buildings, including a monastery and a convent.

Turning south, we pass presently over Nablus,* which, under the name of Shechem, existed in the days of the Patriarchs. The Old Testament records that Abraham, Jacob, and his sons encamped near it. It lies in a deep valley between two mountains which still bear their Biblical names—Ebal and Gerizim. The former, which is one of the highest points in Samaria, rises to over 3,000 feet. Nablus is now a prosperous manufacturing center. Its 30,000 inhabitants are mostly engaged in the prosaic business of making soap.

A striking feature of the plateau system over which we are flying is the regularity of its limestone strata. Seen from above, the general effect is that of a heavily contoured map (see page 343).

JERUSALEM FROM ON HIGH

The first distant glimpse of Jerusalem from the air is disappointing. It spreads over a limestone wilderness which it matches in color; but on nearing the city we see that it possesses a certain distinctive beauty and dignity. Even when viewed from above, its buildings and

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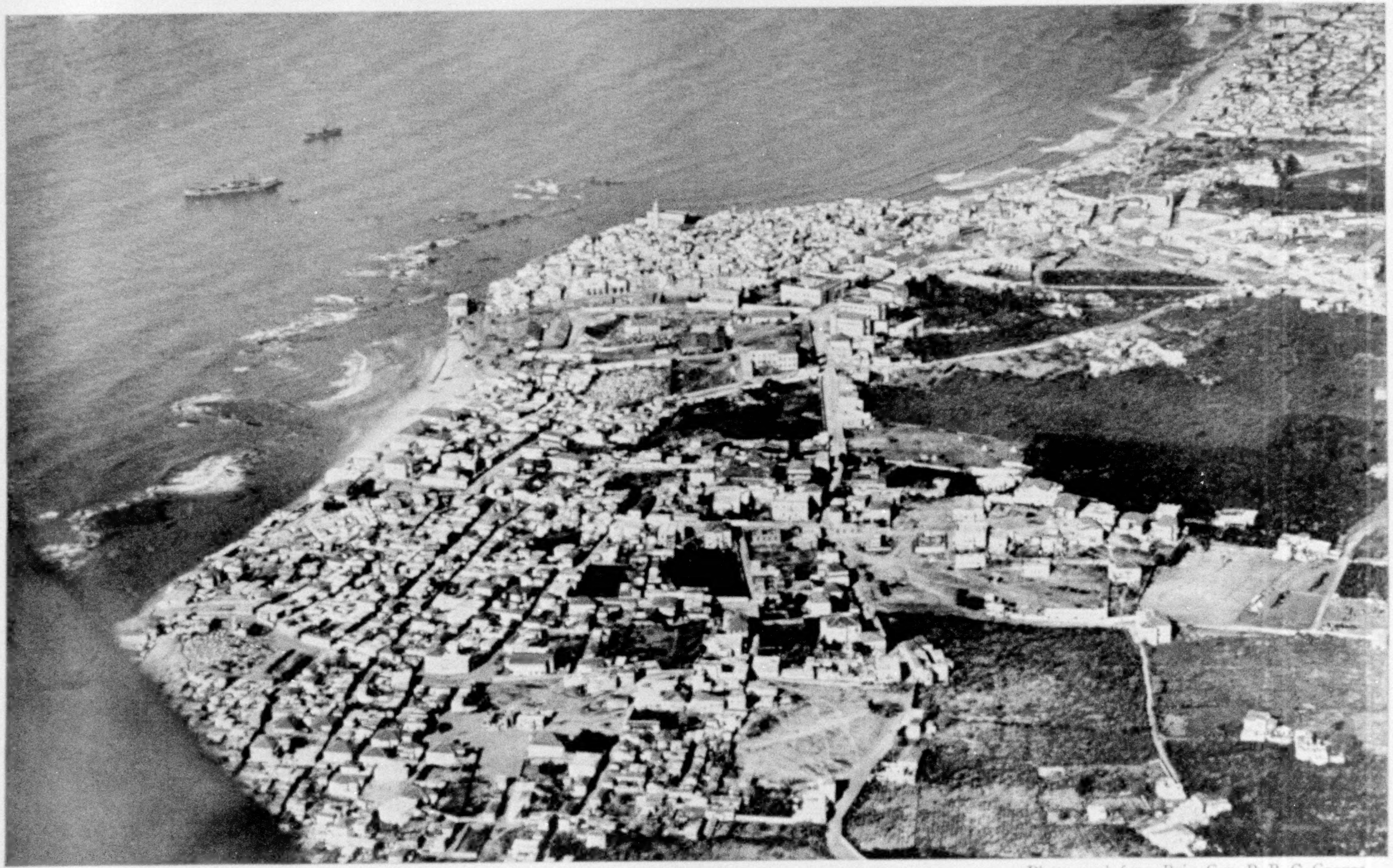
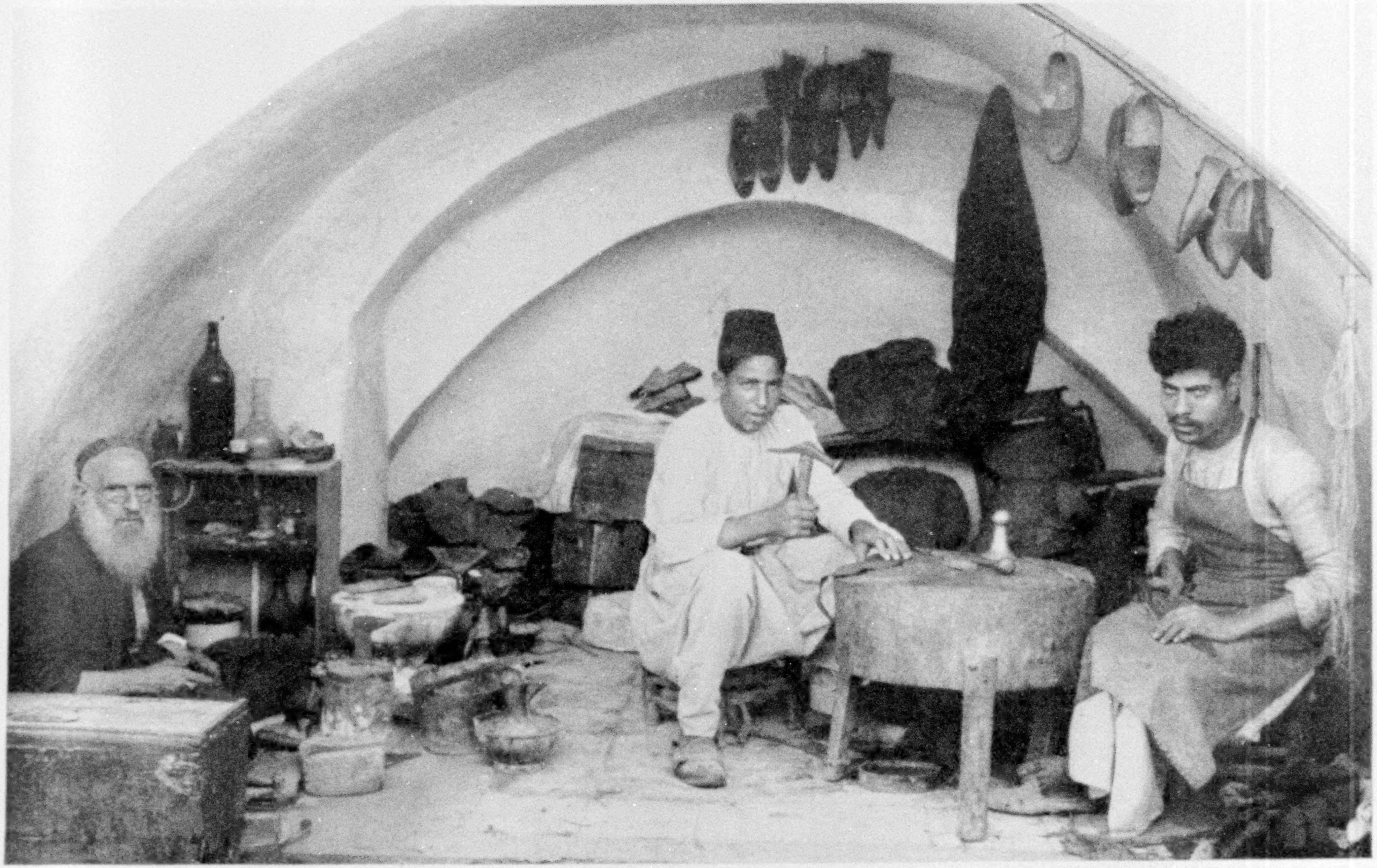
* See, also, "The Last Israelitish Blood Sacrifice," by John D. Whiting, in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1920.



Photograph from Brig. Gen. P. R. C. Groves

JAFFA, "THE BEAUTIFUL," SEAPORT FOR THE HOLY CITY

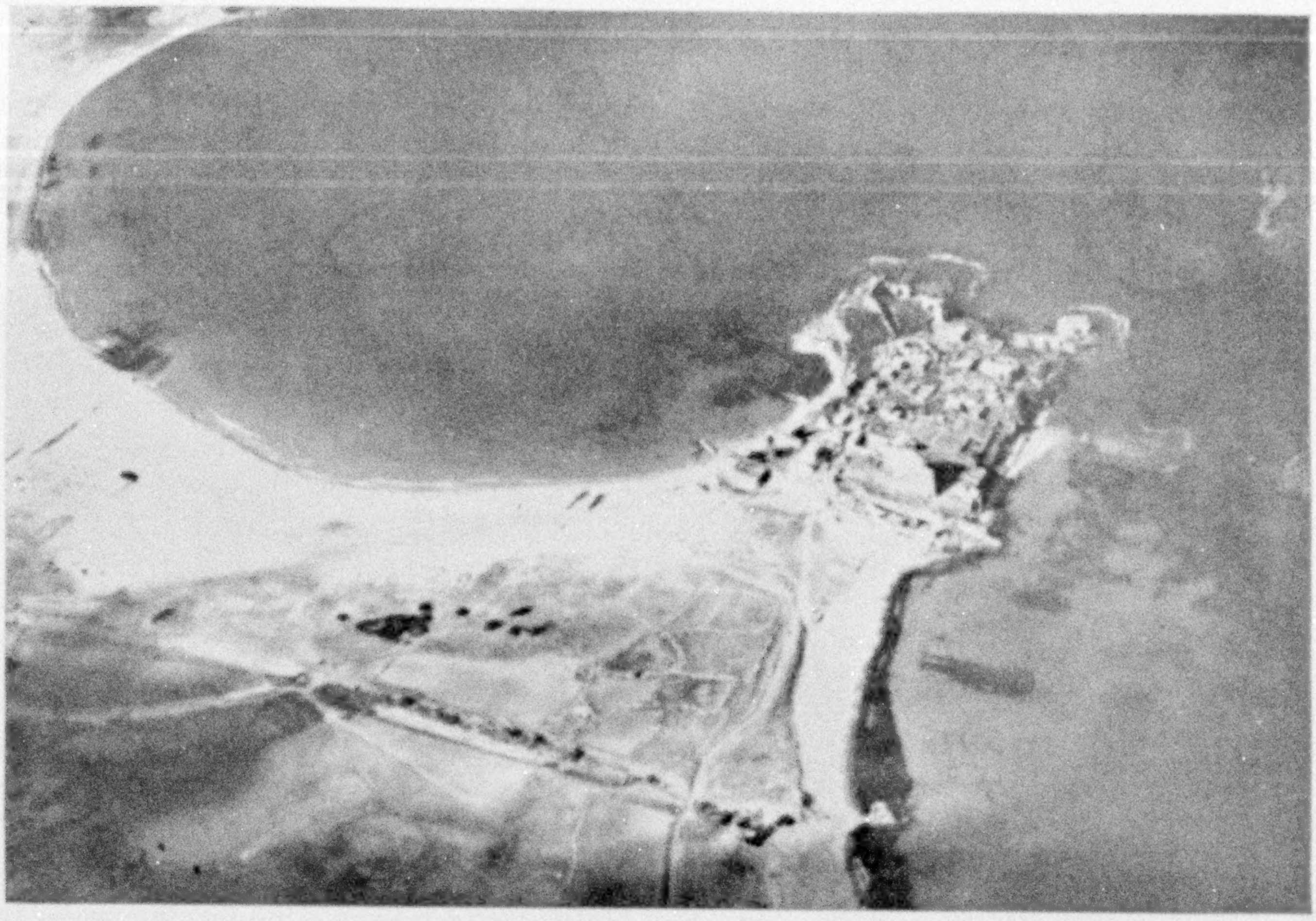
Students of mythology remember this white city as the scene of rescue by Perseus of Andromeda from the sea monster. Biblical scholars recall its association with Jonah's adventures with the great fish, and here St. Peter had his vision in the home of Simon the tanner. The oranges of Jaffa come from groves on the outskirts and are reputed to be as sweet as honey. The dark patch in the lower left is the under wing of the photographer's airplane.



Publishers' Photo Service

A COBBLER'S SHOP IN THE CITY OF HEROD'S SON

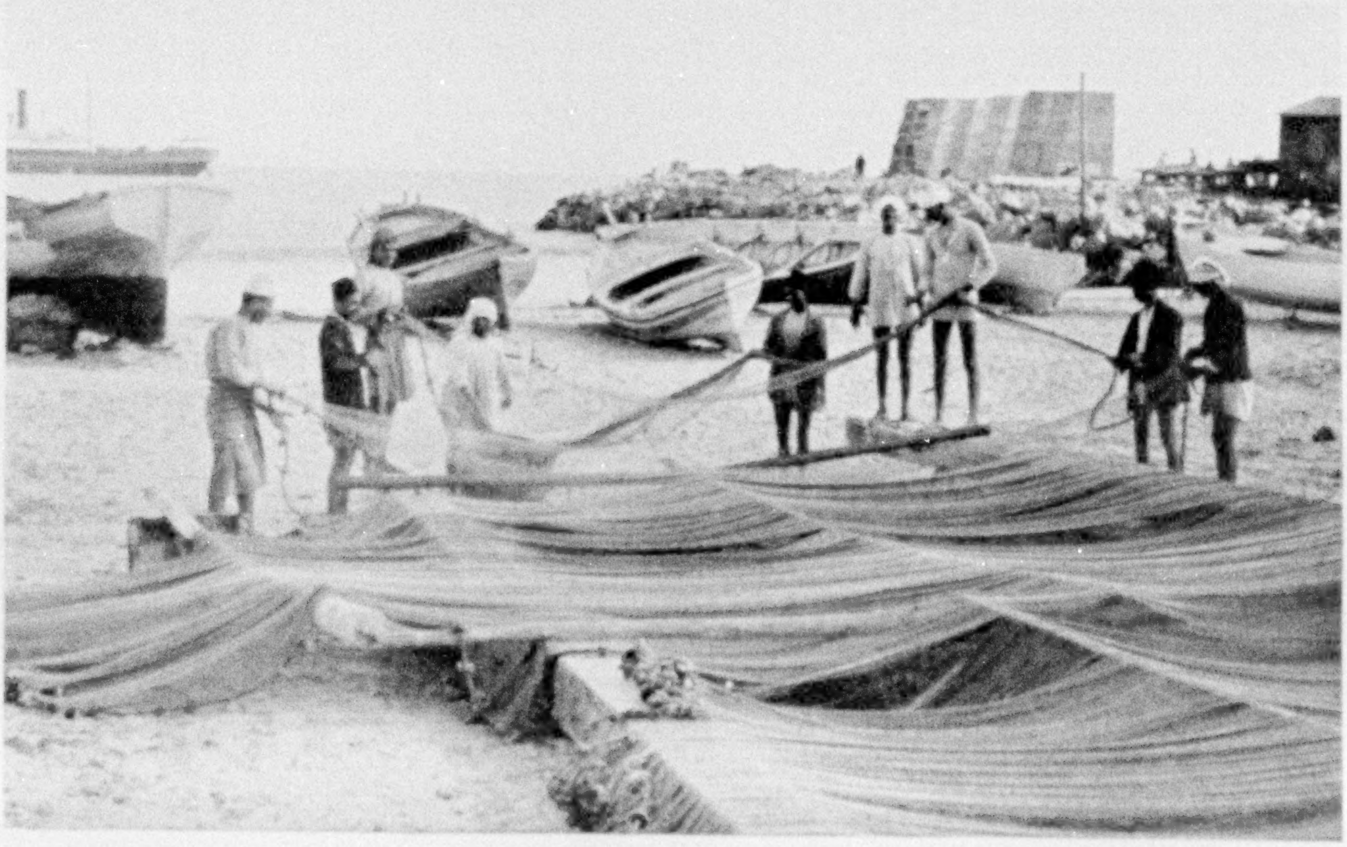
Formerly a splendid metropolis, the emperor-named city of Tiberias is now a squalid mass of buildings and narrow, filthy streets, so notorious for fleas that the Arabs say the king of these insects has his court here!



Photograph Courtesy Air Ministry, Great Britain

THE LAST STRONGHOLD OF THE CRUSADERS IN PALESTINE

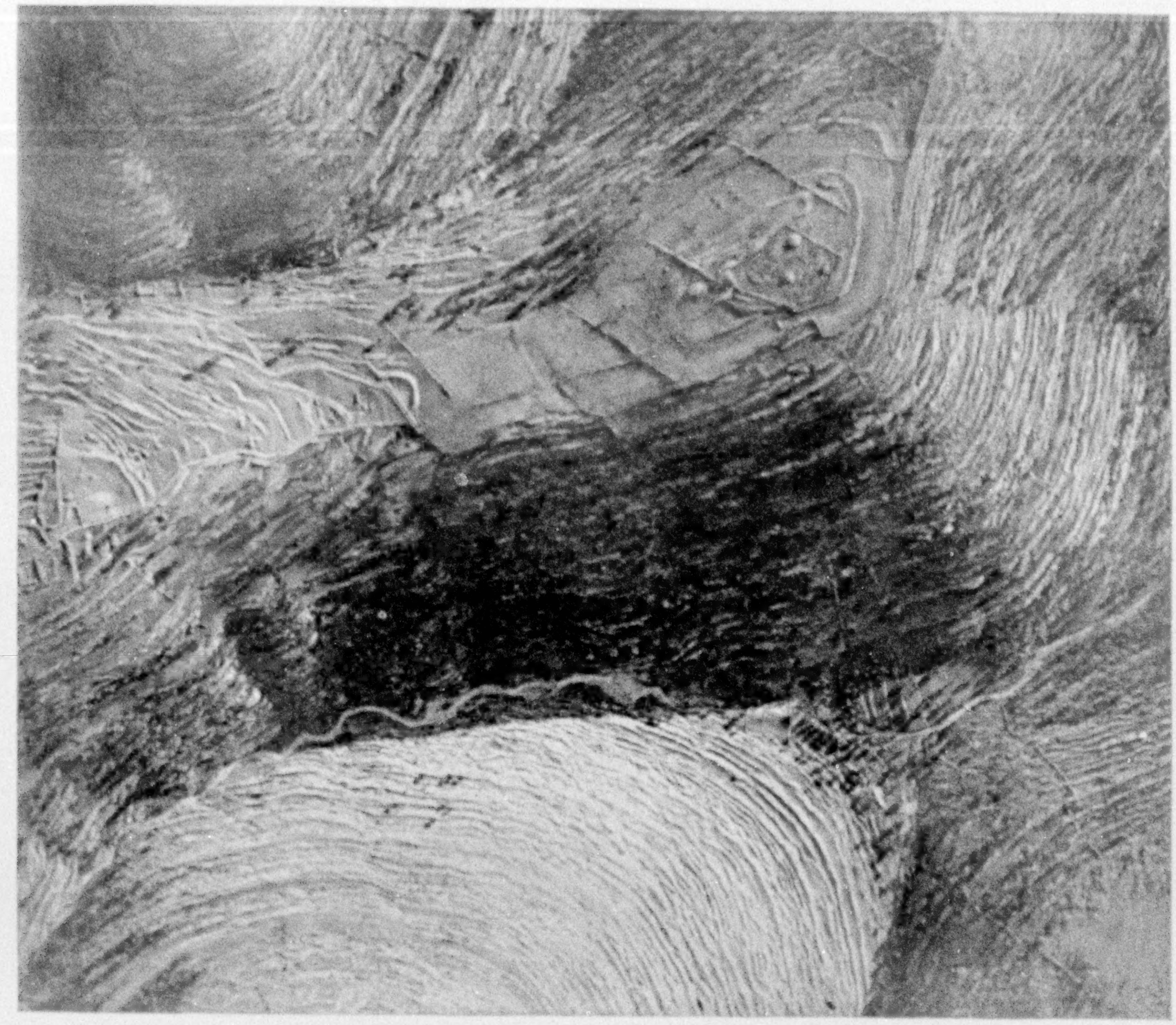
Under the name of Castle of the Pilgrims, and also Petra Incisa (Hewn-out Rock), the bay-girt mountain city of Athlit was strongly fortified by the Knights Templars and made the chief seat of the order. It is now the home of a Jewish colony, with an agricultural experiment station which has produced outstanding results.



Photograph by Maynard Owen Williams

STRAIGHTENING, UNTANGLING, AND DRYING FISHING NETS AT HAIFA

Unmindful of Tancred and the Crusades, these fishermen cast their nets in daily devotion to their simple tasks, for this flourishing seaport is now a modern town, where medieval events are but memories (see text, page 322).



Photograph from Brig. Gen. P. R. C. Groves

A VERTICAL PHOTOGRAPH OF THE JUDEAN HILLS, SHOWING THE LIMESTONE STRATA OF WHICH THEY ARE FORMED

Most of the Judean Plateau consists of stony moorland, upon which scrub, thorns, and dwarf oaks eke out an existence in the midst of bowlders. There are a few patches of cultivation, a few flocks of sheep and goats, and, where the plateau breaks, a village or two of gray stone walls and mud roofs, with perhaps a terrace of vines, and some fig trees or olive groves.

numerous towers and domes are impressive (see page 348).

At one end of the city the beautiful Dome of the Rock, frequently called the Mosque of Omar, occupies the center of an immense terrace upon which the Temple and Solomon's palace once stood.

The effect of the city's commanding position on the edge of the Judean Plateau is enhanced by the high crenelated walls which overlook the deep valleys of Hinnom and Kidron. In these valleys and on the slopes of the neighboring hills there are extensive olive groves, which help to soften the arid landscape. Here and there a stately black cypress stands out vividly against a white building.

There are few more striking panoramas than that which meets the eye from a height of several thousand feet above the Holy City. From this vantage point one can take in at a glance the main physical features of the whole of southern Palestine.*

Below us, running approximately north and south, is the plateau system of Judea and Samaria, which forms the backbone of the country. West of this ridge lies

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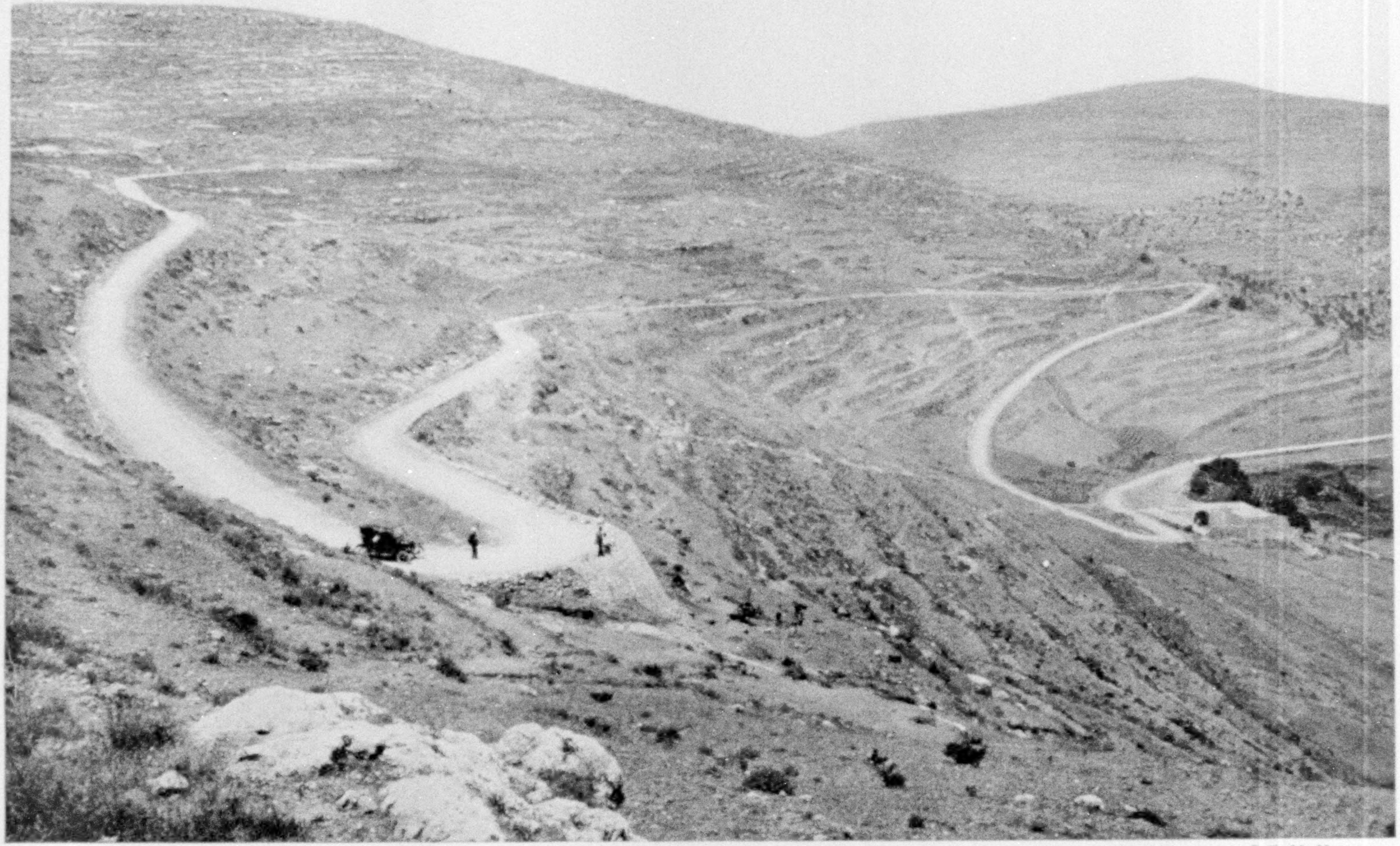
* See, also, in the NATIONAL GEOGRAPHIC MAGAZINE, "Impressions of Palestine," by James Bryce, March, 1915; "Village Life in the Holy Land," by John D. Whiting, March, 1914, and "An Old Jewel in the Proper Setting—the Reconquest of the Holy Land," by Charles W. Whitehair, October, 1918.



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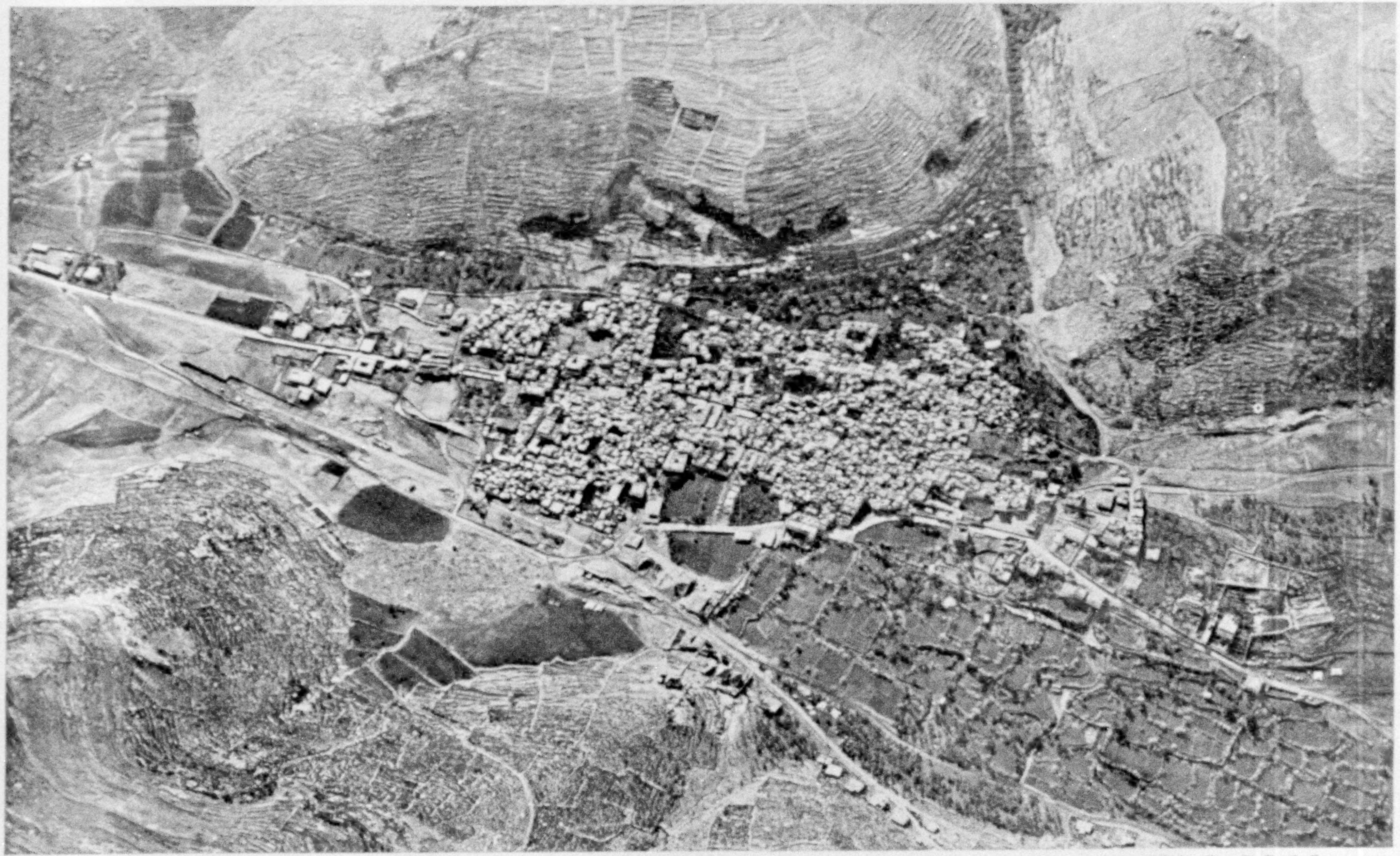
ON THE WAY FROM TIBERIAS TO JERUSALEM

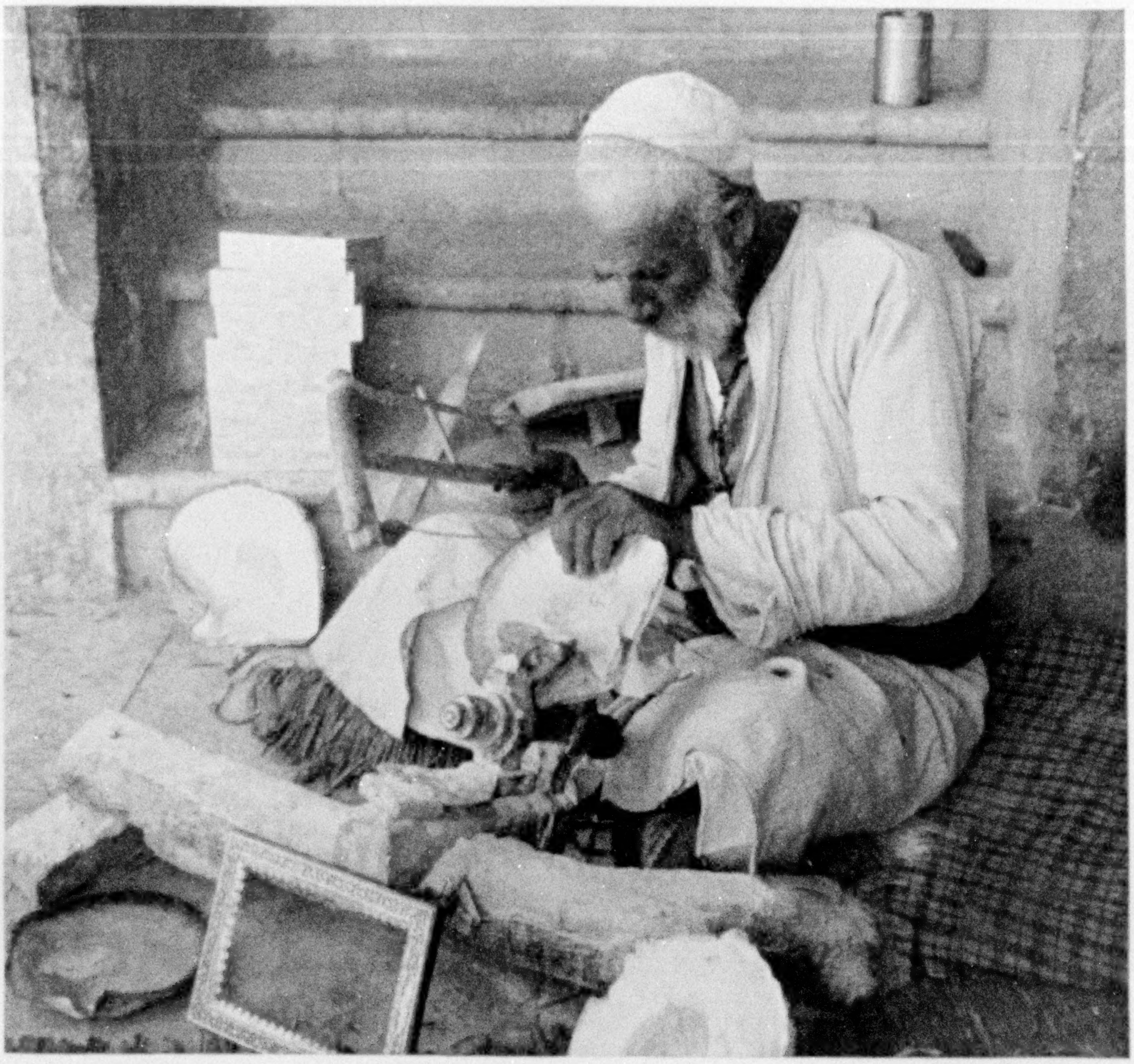
The meandering white ribbon is one of the superb military roads built by the British.



Photograph from Brig. Gen. P. R. C. Groves

THE HOME TOWN OF THE VANISHING SAMARITANS

At Nablus (Shechem) Biblical history brings Abraham into Canaan, and here also Joshua addressed an assemblage of the tribes. In the background are the outlying spurs of Mount Gerizim, about which center certain religious rites of the Samaritans, who call themselves the only true Israelites. This almost extinct sect performs the Passover sacrifice literally, eating with shoes bound upon the feet and with staves in hand, as if ready to begin their wanderings in the Wilderness.



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A MOTHER-OF-PEARL WORKER IN BETHLEHEM

The chief business of the present-day Bethlehemite is the manufacture of articles from wood and mother-of-pearl for sale to pilgrims and for shipment abroad. "Pearl waste" is imported from the United States, and the work of carving is frequently done by women and girls who receive from 12 to 25 cents a day.

the maritime plain; east of it the great depression which contains the Jordan and the Dead Sea. Beyond this depression rise the bare mountain masses of Ammon and Moab.

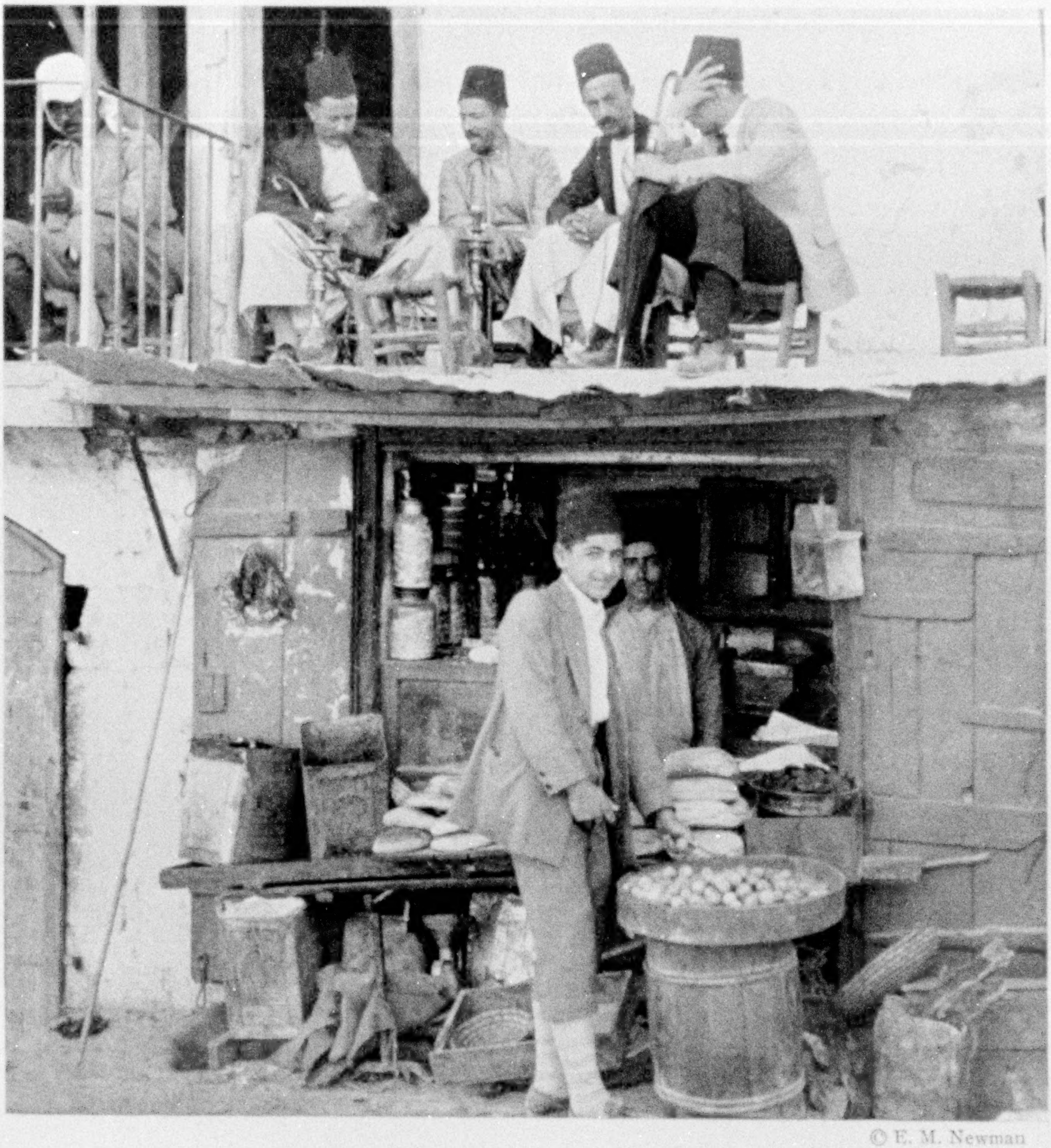
The contrast is arresting—on the one hand a smiling plain bordering the sea; on the other, one of the most desolate and forbidding landscapes on earth.

Within easy range of vision lie the one-time territories of eight of the tribes of Israel. As your gaze travels northward it passes over the ancient homes of Benjamin, Ephraim, Issachar, and Manasseh. The tribe of Dan inhabited the maritime plain to the west, and Judah the hilly country to the south. Northeast and east, across the Jordan Valley and the Dead Sea, lived the tribes of Gad and Reuben. They were wardens of a frontier which was subject to attack by the Ammonites and Moabites, who inhabited the neighboring desert.

In the nearer landscape it is not difficult to identify, with the aid of a map, Bethel, Jericho, Gilgal, Bethlehem, Bethany, and many other small white towns and villages whose names are familiar to Christendom.

THE DEAD SEA PRESENTS A SINISTER ASPECT

It is probable that the air tourist will land at Jerusalem and spend a few hours



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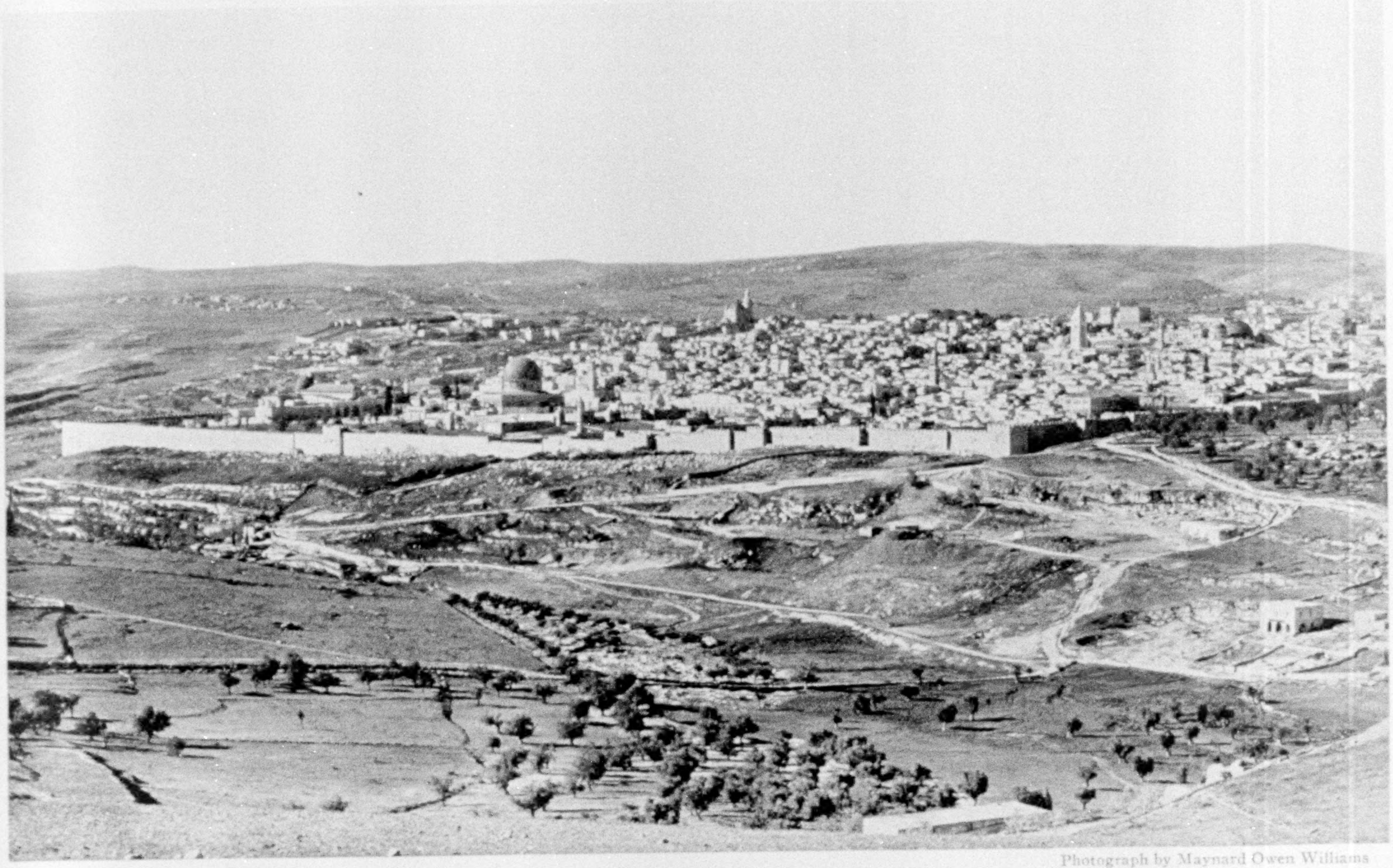
A BALCONY SCENE AND STORE NEAR THE JAFFA GATE: JERUSALEM

This youthful merchant is pleased with his store's location, near the chief business gate of the Holy City, which leads to the railroad station outside the walls and connects with roads to Bethlehem, Hebron, and Jaffa. He makes many a sale of fruit and the flat cakes, which are the city's bread, to the constantly shifting, animated throng of pilgrims, donkey drivers, traders, and travelers. His elders above are discussing the virtues of the water pipe.

in seeing the sights; but we are now making a round tour in order to gain a general impression of Palestine as seen from the air. Let us, then, turn eastward, throttle down the engine, and glide.

Jerusalem slips away from beneath us and in a few minutes we are over the Dead Sea. This dark-blue sheet of water, 47 miles in length by 10 in width at its broadest part, lies 3,800 feet below the Holy City and 1,300 feet below the level of the Mediterranean.

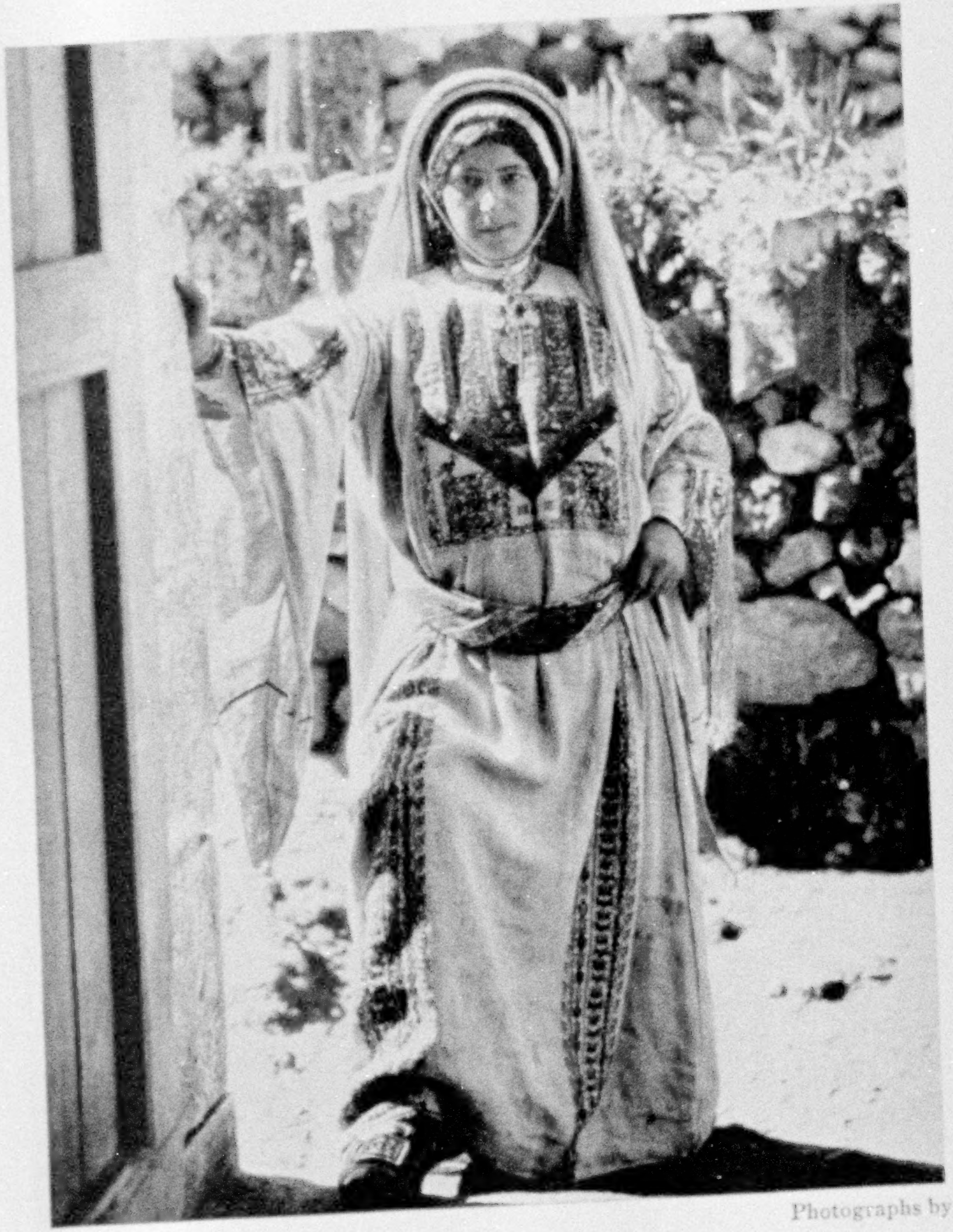
There is something awe-inspiring about this great gulf over which we are now flying—a lifeless, sinister aspect, the desolation peculiar to a volcanic region. Perhaps the most striking features about the Dead Sea are the lines of terrific cliffs of limestone which form its eastern and western shores. The cliffs, which are destitute of vegetation, rise to an elevation



Photograph by Maynard Owen Williams

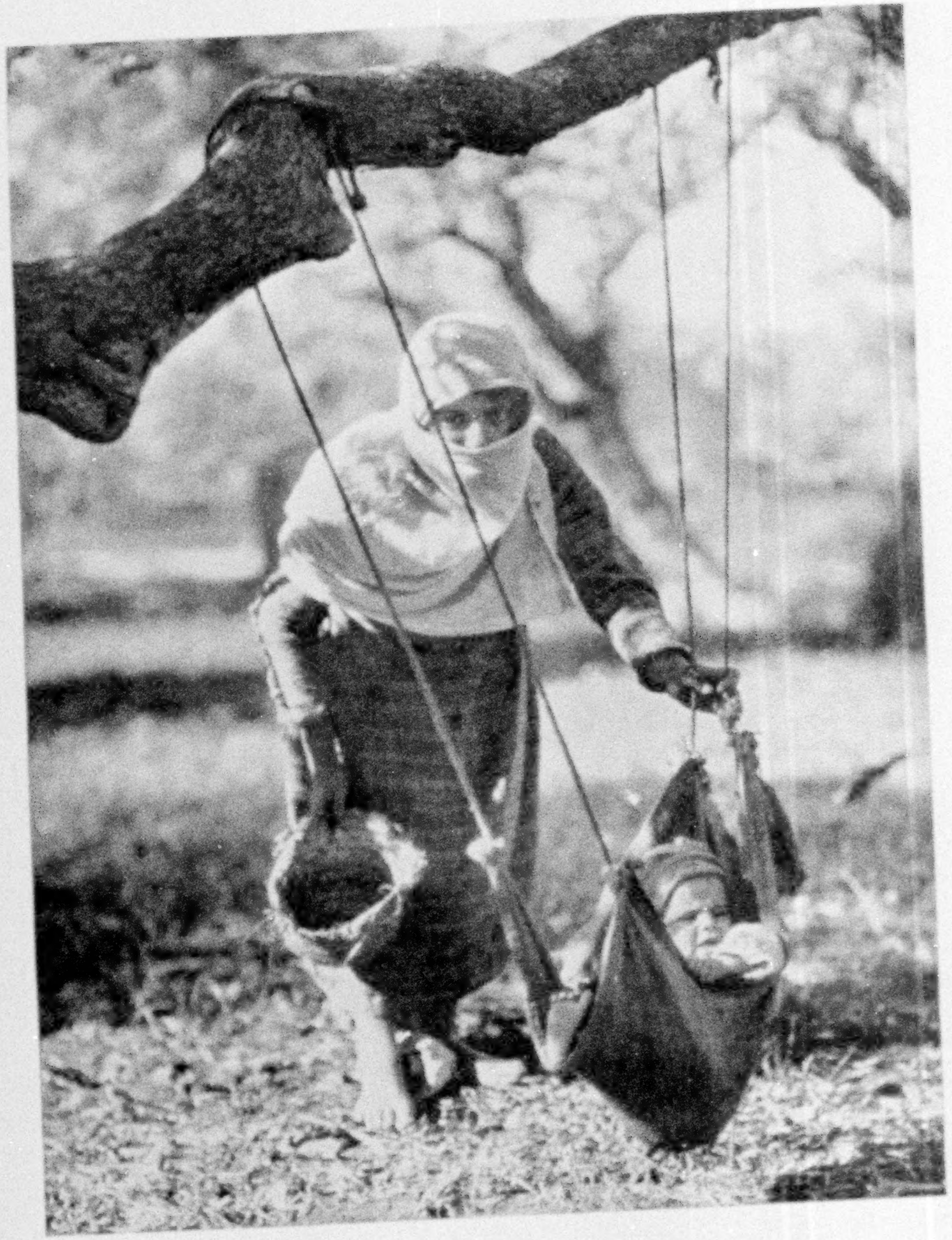
"THE TRIBES OF GOD GO THITHER": JERUSALEM

The shrines of the Holy City are sacred to three great religions of the world, and will become even more accessible to pilgrim throngs when the aviation passenger route is established between Cairo and Jerusalem (see text, page 313). The Dome of the Rock (left center) is a mosque, covering the huge rock about which cluster many traditions. It is said to be the altar built by Abraham for Isaac, to hover over the waters of the Flood, and to be the center of the world.



A BRIDE OF PALESTINE

At wedding time the dark-blue workaday dress gives way to a heavy white linen, embroidered in green, red, and orange. The rows of gold and silver coins sewn to the caplike part of the headgear in front denote her married state and must not be removed except in dire necessity. Her capacious veil, which covers all of the headdress save the coins, may be taken off at home but not in public.



Photographs by Maynard Owen Williams

A DRUSE WOMAN OF GOOD FAMILY

The scene is a corner of the third largest olive grove in the world, which lies in the plain south of Beirut, below the Druse village of Shuweifat. The Druses, among other fine qualities, have a great reverence for women. The hammock crib hung to the tree is a Syrian substitute for the wooden cradle which the Palestinian woman carries to the fields with her when she goes to work.

Photograph by Dr. H. D. Girdwood, © Realistic Travels

RUSSIAN PRIESTS BLESSING THE RIVER JORDAN

Each year thousands of pilgrims from Russia journey to Jerusalem for the religious ceremonies. Each tries to carry back with him a bottle of water from the Jordan, a bit of palm leaf, or a flaming candle from the Holy Fire ceremony at Jerusalem.

of 1,500 feet on the west and 2,500 feet on the east. Beyond this line of beetling precipices, on the eastern side, towers the Moabite escarpment, an array of rocky peaks from 3,000 to nearly 6,000 feet high, naked, arid, and majestic.

LEVEL OF DEAD SEA WAS ONCE 1,200 FEET HIGHER

Our glide down from Jerusalem has brought us over the northern shore, where the turbid Jordan enters the sea through an extensive muddy flat which is strewn with flotsam brought down by the river—mostly rotting tree trunks incrusted with salt and dead branches gray with salt deposit. From above, this dreary waste of mud looks as if it were strewn with the moldering skeletons of strange prehistoric beasts.

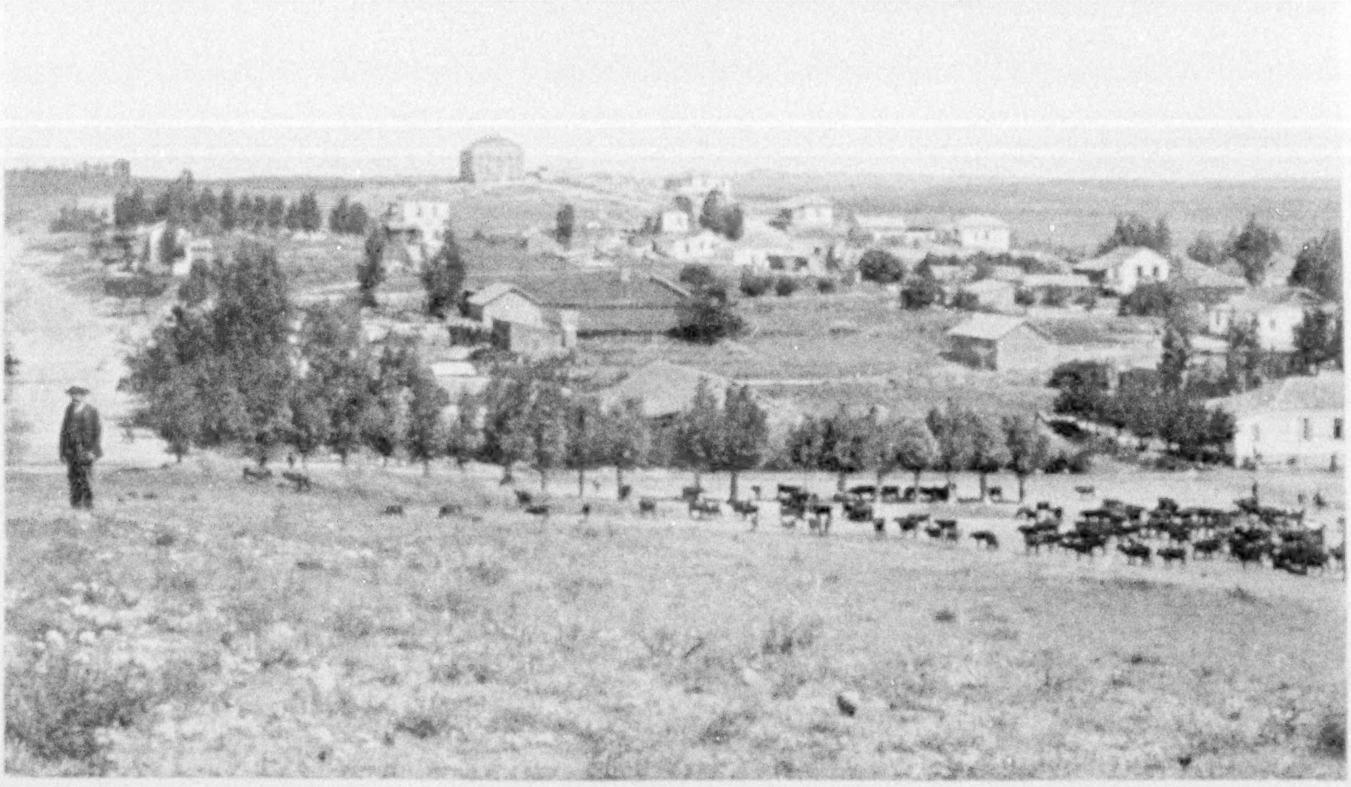
Looking northward across this flat, we see the great canyon through which the Jordan winds in tortuous curves among dense reed beds and thickets of tamarisk and oleander. The lofty escarpments on each side of the river are formed of marl, chalk, and limestone. They descend to the river's bed in a series of terraces and rugged steep-sided gorges. Their general color, which is a creamy white, gives the wild landscape a peculiarly bizarre—one might almost say weird—appearance.

Turning our backs on this scene, we fly southward along the eastern shore of the

© Publishers' Photo Service

THE WILDERNESS WHICH SURROUNDS THE RIVER JORDAN NEAR JERICHO

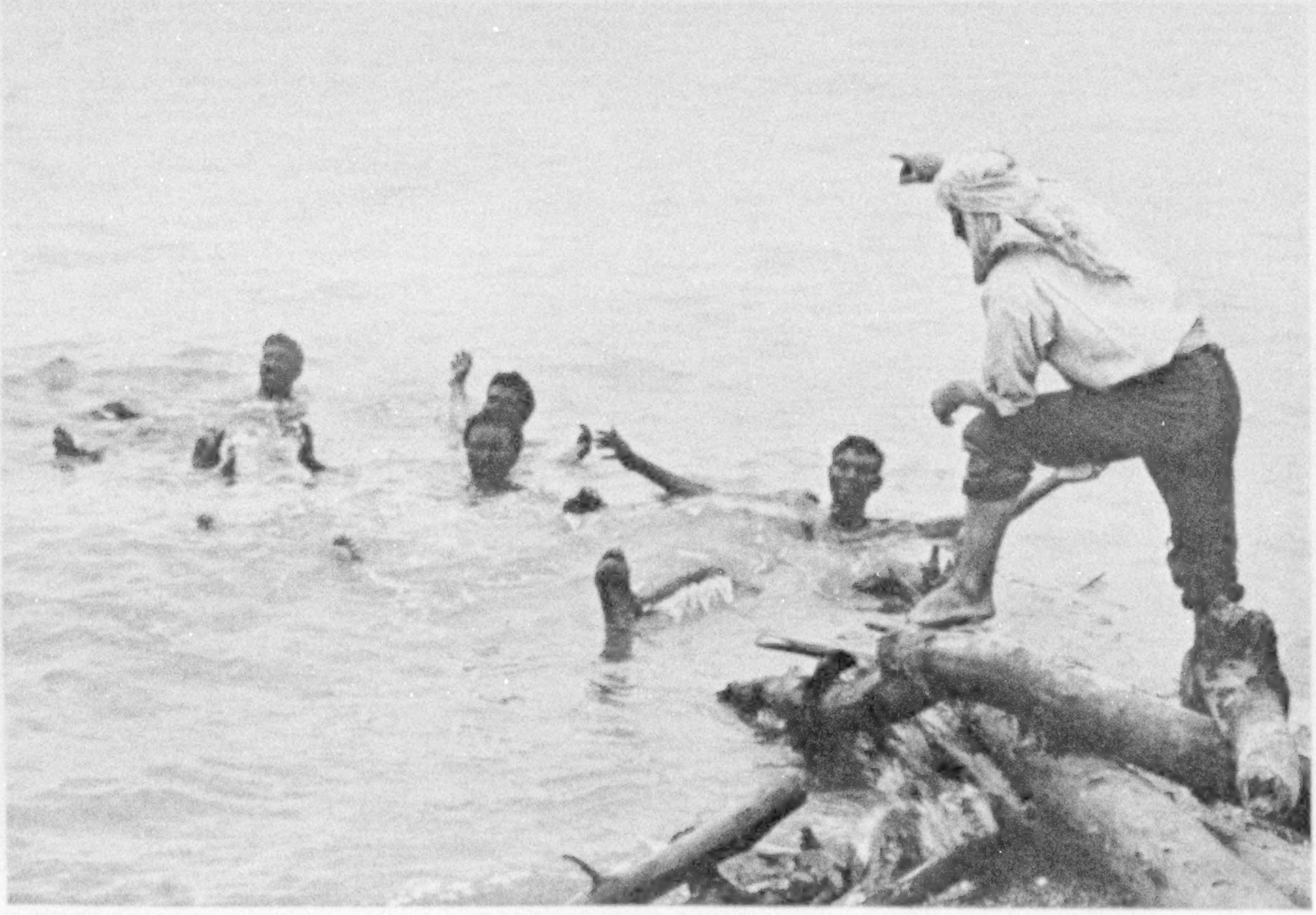
Palestine's only important river is well named the "Down-Comer," for in its winding course of 200 miles it rushes down a continuous inclined plane to its outlet, at 1,300 feet below sea level (see text, page 347). Its waters have never been navigable; its banks have nurtured no important town (Jericho lies some distance west); it has no wharves, or boats, or bridges of any size; and it ends its life in a salty inland sea. Its valley was the Wilderness of Hebrew times.



Photograph from Brig. Gen. P. R. C. Groves

JUDEA AGAIN FLOWS WITH MILK AND HONEY

Rechoboth, founded in 1890, is the second largest as to area of the Zionist colonies in Judea. Its inhabitants are endeavoring to recreate the Palestine of the past by the use of modern farming methods (see, also, text, page 322).



Photograph by Dr. H. D. Girdwood, © Realistic Travels

BEDOUINS FLOATING IN THE DEAD SEA

Extraordinarily rapid evaporation causes the Dead Sea water to be highly impregnated with mineral matter. It is so salty that the bather easily floats, but in swimming the feet fly up and little headway can be made. It was at one end of this lake, according to the account in Genesis, that Lot's wife looked back toward the fleshpots of Sodom.

Dead Sea, noting, as we pass, lava beds, stretches of gray pumice stone, gleaming patches of vitreous rock, and other signs of volcanic action.

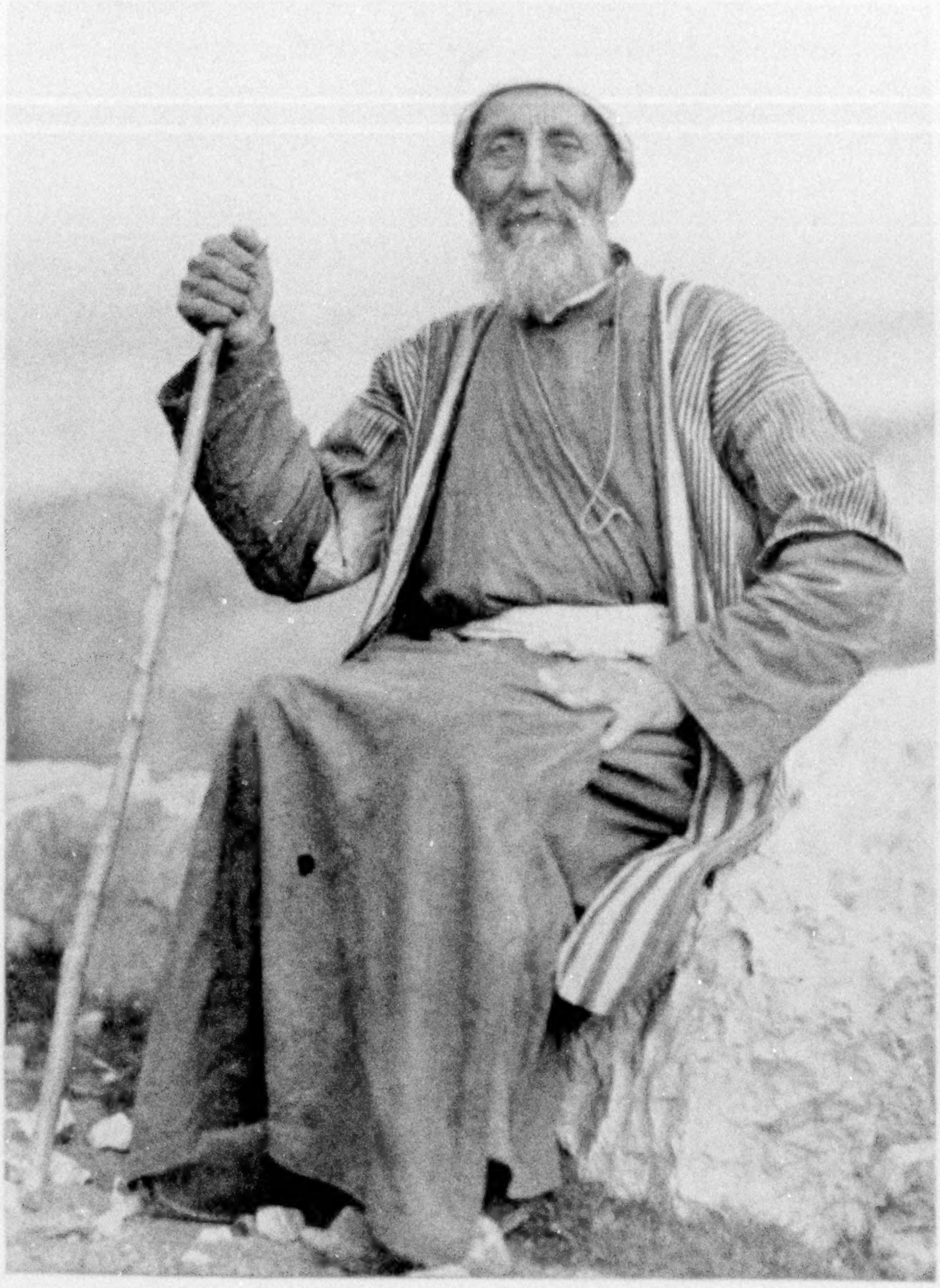
Soon we approach an extensive promontory which juts out from the base of the Moabite escarpment. It is flat and bare and its sides are low, perpendicular cliffs. The promontory, which the Arabs have named El Lisan (The Tongue), is of special interest because of its scientific significance. Geologists have established that the level of the Dead Sea was once 1,200 feet higher than it is to-day. The sea then formed part of a lake 120 miles long, which embraced Lake Tiberias and Lake Huleh.

A DEADLY REGION SHUNNED BY MAN

El Lisan and corresponding terraces of rock on the west side of the Dead Sea are portions of the bed of this ancient lake, which disappeared as a result of a volcanic upheaval followed by a subsidence. The depression thus formed, known as the Ghor (Arabic, El Ghor—The Trough), contains the River Jordan and the three lakes through which it passes—Huleh (the Biblical Waters of Merom), Tiberias, and the Dead Sea.

The Ghor persists south of the Dead Sea as a depression some ten miles in width and extends for a distance of 110 miles, to the Gulf of Akaba. The southern portion of the Ghor, including the Dead Sea basin, is a deadly region, which, except in winter, is shunned by the Arabs. For nine months in the year its climate is equatorial. Its summer temperature often reaches the neighborhood of 130 degrees Fahrenheit; it is frequently swept by dust storms and, except for the Jordan Valley, it is practically waterless.

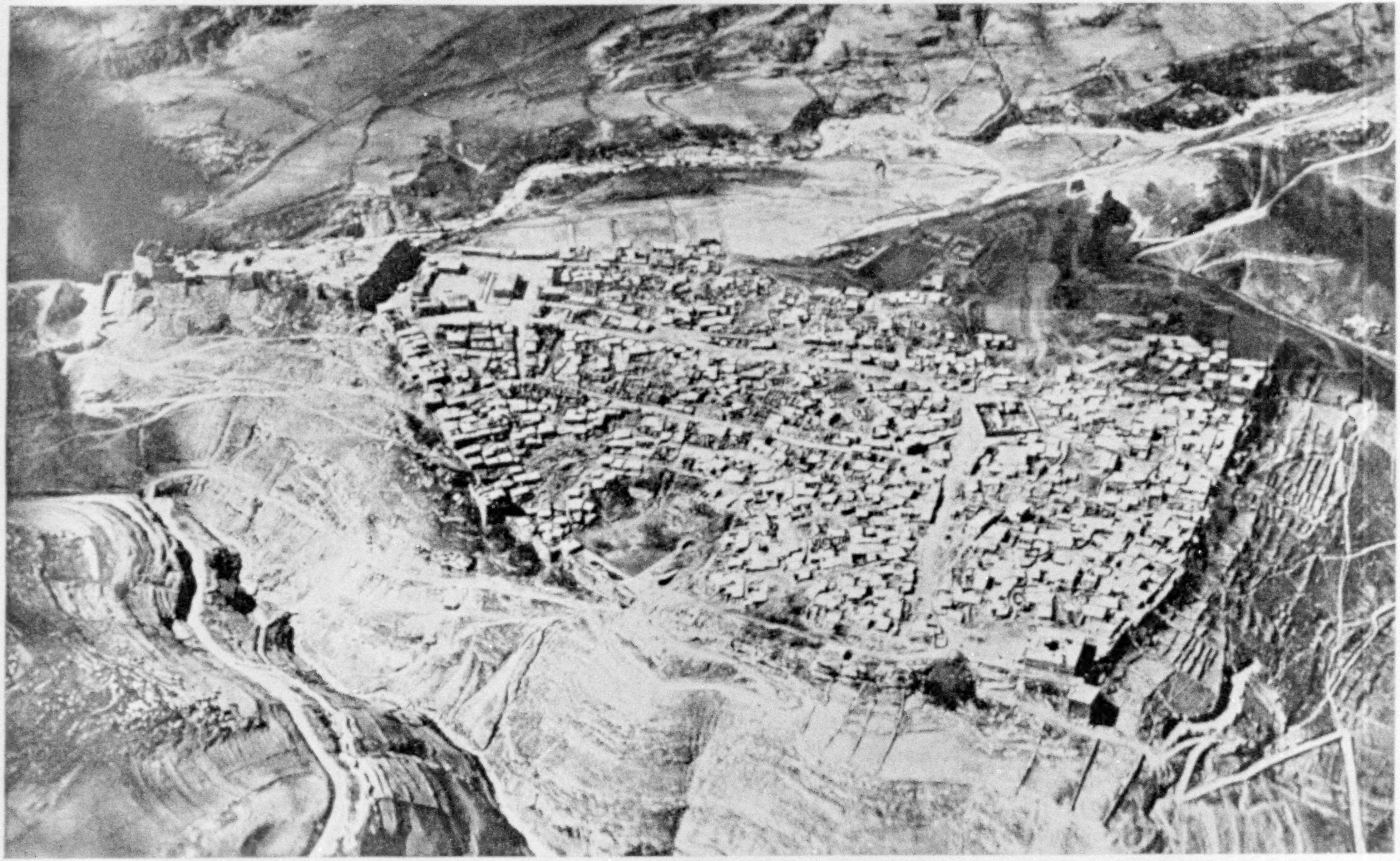
From above the peninsula of El Lisan one sees that the water south of it is shallow and shelves into a dreary marsh which borders the desolate mud flats forming the southern shores of the Dead Sea. Beyond these flats rises the remarkable ridge of rock salt which is called by the Arabs Khashm Usdum (The Ridge of Sodom), seven miles long and with an average height of 300 feet.



Photograph by Maynard Owen Williams

A DRUSE OF THE GREAT LEBANON

The numerous Druses in the Lebanon are quite distinct from those in Jebel ed-Drûz, beyond the lava wastes of El Lejâ. The old men, who, as a rule, object to having their pictures taken, are a handsome lot.



Photograph from Brig. Gen. P. R. C. Groves

LOOKING DOWN ON EL KERAK, A WALLED TOWN OF 20,000 INHABITANTS, MOSTLY ARABS

The town is built on a hill, more than 3000 feet high, and is situated in the land of Moab, east of the southern end of the Dead Sea (see text on opposite page). Note the citadel at the lower right corner. This photograph was taken from a height of 7,000 feet.

On the shore opposite El Lisan stand the ruins of the ancient Jewish fortress of Masada. The low hill which they occupy is overshadowed by a towering, coneshaped mountain of the same name.

According to Josephus, the fortress was built by Jonathan the Maccabean. It was enlarged by Herod the Great, who added an enormous encircling wall furnished with 37 towers. The fortress was built to guard the narrow strait between El Lisan and the western shore.

Despite the absence of timber for boatbuilding, the crossing would not present any considerable difficulty, as the distance is only 2½ miles, and the water is so buoyant that the human body cannot sink in it. Rafts made of brushwood or of inflated skins would serve to carry men across.

LOOKING OVER THE BACK GATE OF PALESTINE

If you wish to know what enemy threatened this back gate of Palestine, look eastward and you will see El Kerak (Kir of Moab), which was one of the principal strongholds of the Moabites. It is less than 15 miles away and worth a visit (see page 354).

One looks down on a walled town which occupies the entire summit of a steep-sided table mountain. At one end is an immense fort, with high, massive walls. It was strongly garrisoned by the Turks when they were masters of Palestine, for its inhabitants, mostly Arabs, are notoriously turbulent and warlike.

It is probable that this great citadel was originally built by the Romans when they established their eastern outposts in these highlands of Moab. The Roman road from Damascus to Akaba touched El Kerak, and if one rides along the rough track which leads northward from that mountain fastness one may still see the ancient milestones and pass the ruins of bridges built by Roman legions.

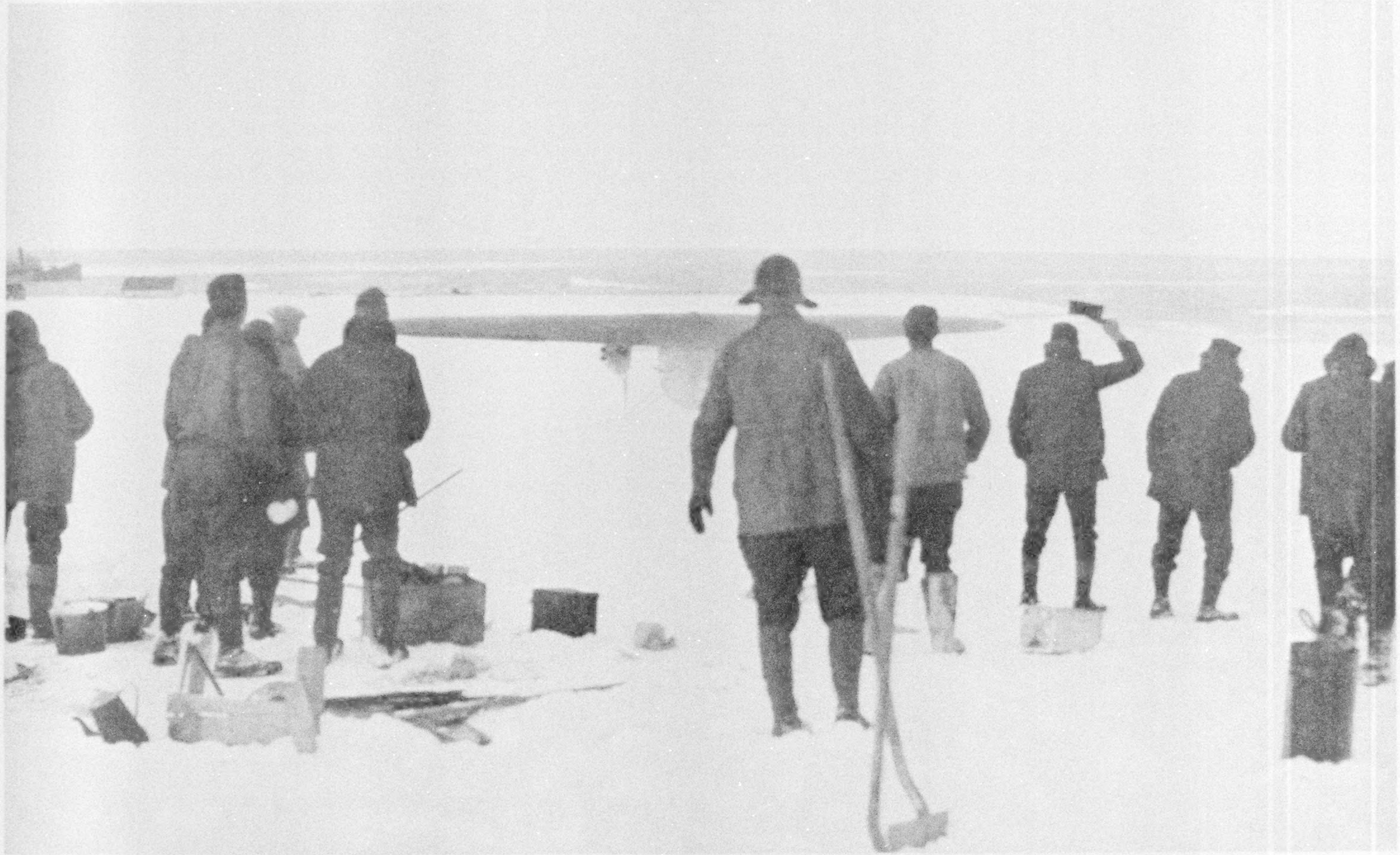
The distance from El Kerak, near the southern end of the Dead Sea, to Ismailia, on the Suez Canal, is only 200 miles in a straight line. But that stretch of country is waterless and uninhabited, and a forced landing on the way would be an unpleasant ending to the day's outing. It is wiser to return by the usual airway, which we reach by steering for El Arish via Beersheba.

The latter place has the appearance of a small modern town. Its streets are straight and cross each other at right angles, and it has several large buildings and two public gardens. One may wonder why such a town developed on the dreary borderland of the Desert of Sinai. The explanation is that it was an important Turkish base during several years of the World War and was built under German direction as a military settlement. On its outskirts is a mudbuilt Bedouin hamlet which is the prewar Beersheba.

From El Arish we retrace the outward route. It is easy to follow—first along the coast to the Bardawil Peninsula; then, via the oases, across "the desert's dusty face," to Ismailia; thence along the edge of the Delta, where the shadows of the palm trees are already reaching out over the yellowing sands, to the airdrome at Heliopolis.

And so back from Galilee in good time to partake of the fleshpots of Egypt on the terrace of a Cairo hotel!

Notice of change of address of your NATIONAL GEOGRAPHIC MAGAZINE *should be received in the office of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your November number, the Society should be notified of your new address not later than October first.*



OFF FOR THE EPOCHAL FLIGHT

The monoplane is scudding over the icy track just before it leaves the land to begin its 16-hour flight to the top of the world and return.

THE FIRST FLIGHT TO THE NORTH POLE

By Lieutenant Commander Richard Evelyn Byrd, U. S. Navy (Ret.)

On May 9, 1926, Floyd Bennett and I looked down upon the North Pole from our monoplane, completely verifying Peary's observations, and demonstrating the feasibility of using airplanes in any part of the globe.

We observed thousands of square miles of the Polar Sea never before seen by man, and returned safely to our base at Spitsbergen after an absence of nearly sixteen hours.

We discovered no land near the Pole. We made no aëronautical records of altitude or duration. We did not suffer any extraordinary hardships, nor can we claim any great personal achievement.

We simply took advantage of the knowledge gained by three centuries of Arctic heroes and applied our Navy training to aviation, that great science born in this country, and so added a short paragraph to the story of man's conquest of the globe on which we live.

Seventeen years ago Peary's trip to the North Pole and back kept him out of touch with civilization for more than 400 days. Bennett and I left civilization early one morning, visited the northern apex of the earth, and returned on the afternoon of the same day.

Peary's success was the climax of 400 years of Arctic struggle. The history of polar flying has been far briefer, though equally dramatic.

There are three routes by which the Polar Sea may be readily approached: the Bering Sea route, up past Alaska; the so-called "American route," northward through Baffin Bay, along the west coast of Greenland; and the European route, via Spitsbergen.*

EXPEDITION TAUGHT ARCTIC FLYING METHODS

In the summer of 1925 the MacMillan Arctic Expedition, under the auspices of the National Geographic Society, with the U. S. Navy coöperating, was assured by the approval of President Coolidge. The mission of that expedition, however, was to explore up Peary's way and not to fly toward the North Pole.

Six thousand miles were flown with the three Loening planes (including round trips and repeated flights) and two advanced bases were put down.

Aside from its scientific value, I believe that Expedition made a valuable contribution to exploration by air, for something was learned about flying in the Arctic.*

Etah, Greenland, up Peary's way, is not accessible until midsummer and, therefore, as at Point Barrow, Alaska, to take advantage of the good spring weather for flying, it is necessary to winter there, or at least get all the supplies up a year ahead.

REASONS FOR SELECTING SPITSBERGEN FOR BASE

Spitsbergen, however, is affected by the warming influence of the Gulf Stream. Kings Bay, only 700 miles from the Pole, can be reached in the spring. This settlement is nearly 500 miles nearer the Pole than the northernmost point of Alaska.

That is why we selected Spitsbergen. We could reach it in the spring and take advantage of the best Arctic weather and the leveling and smoothing effect both on the land and the ice of the great snow sheet that covers everything.

It was our object to explore toward the Pole via Cape Morris Jesup.

At the time there already were announced several Arctic expeditions, with the first transpolar flight as their main object. This lent the zest of competition to our plans.

When Secretary Wilbur, who has taken much interest in exploration of the Arctic by air, unhesitatingly promised me leave of absence, I immediately called on Edsel Ford for assistance.

When I had told him our plans, and,

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* See Map of the Arctic Regions, in six colors, issued as a supplement with the National Geographic Magazine for November, 1925.

* See, also, "Flying Over the Arctic," by Lieut. Commander Richard E. Byrd, Jr., and "The MacMillan Arctic Expedition Returns," in the National Geographic Magazine for November, 1925.

A FEW OF THE MEN WHO MADE POSSIBLE THE POLAR FLIGHT

Left to right they are: W. C. Haines, United States Weather Bureau, Expedition Meteorologist; W. J. Gray, Second Engineer; T. B. Mulroy, Chief Engineer; Capt. M. J. Brennan, Master of the *Chantier;* Commander R. E. Byrd; Floyd Bennett, Aviation Pilot, United States Navy; M. P. Hanson, Radio Engineer, Naval Research Laboratory; Lieut. G. O. Noville, United States Naval Reserve, Flight Engineer; Lieut. A. N. Parker, United States Marine Corps Reserve, Pilot, and T. H. Kinkaide, Motor Engineer.

with much embarrassment, asked if he would back us, he answered in the affirmative without a moment's hesitation. Because I requested a limited amount, some of his friends readily joined with him in helping us. The rest of the funds necessary were not so easily obtained.

THERE ARE NO AIRPLANE OR GASOLINE STATIONS IN THE ARCTIC

In aërial exploration great attention to detail must be the order of the day. The many delicate instruments must be treated with graphite instead of the ordinary grease, on account of the hardening effect of the extreme cold on the latter.

To the Expedition's flight engineer goes the credit for so efficiently assembling the material that we lacked nothing after we reached Kings Bay.

Here we come to a very interesting thing about Arctic exploration by air. Hundreds of people, men and women, volunteered to go. We could have recruited an army of assistants.

Civilization may have a softening influence, but the spirit of adventure is far from dormant in America to-day.

We received many letters also from people who had no chance to go with us. One letter from a lady—young or old I do not know—was typical. "Little do you realize," she wrote, "that thousands of people who have no chance of adventure live your adventure with you. Probably you have no idea what pleasure you give us."

After carefully weighing our own experience, as well as the opinion of aëronautical experts, we selected for our flight a Fokker three-engine monoplane.

One was available that had already flown 20,000 miles. It had 200-horsepower Wright air-cooled motors, any two of which would keep it up. That, of course, added greatly to our factor of safety.

It was 42 feet 9 inches long in body, with a wing spread of 63 feet 3 inches. Two 100-gallon gasoline tanks were set in the center of each wing; and two others, each holding 110 gallons, were carried in the fuselage. The additional gasoline we might need we decided to carry in five-gallon cans.

Careful tests of the plane were made

PLOTTING THE COURSE OF THE FLIGHT

Commander Byrd (with pencil) and Aviation Pilot Floyd Bennett (at his left) are making a preliminary study of the polar chart on deck of the *Chantier,* bound for Spitsbergen. To Commander Byrd's right are Lieutenants Noville and Parker (see, also, opposite page).

before we sailed. Its fuel consumption at cruising speed was 28 gallons per hour, lower than was anticipated, and therefore most encouraging. It was capable of a speed as high as 117 miles an hour.

The members of the Expedition were of the volunteer type, and all young, except the steward. But he was one of the best, for he worked as though inspired.

The spirit of these members, and of those who helped us in the preparation, is still a matter of wonder to me.

Malcolm P. Hanson, a radio engineer attached to the Naval Research Laboratory, is one of the best short-wave experts in the country, and undertook to install the short wave on the Expedition ship *Chantier.* The short wave gets long distances by day or night, with little power, and was the only kind of radio that would enable us to get back to the *Chantier* from the plane in the event of a forced landing.

After arduous labor on the part of all hands, we left New York on April 5 with half a hundred men, six months' food, and 15,000 miles of coal on board.

Captain M. J. Brennan and his three mates of our Merchant Marine did a fine job in taking that Shipping Board steamer *Chantier,* which had been laid up for years, to Spitsbergen and back, 10,000 miles, with a largely landlubber crew.

Nor must we forget Chief Engineer T. B. Mulroy and his assistant engineers for their achievement in steaming that great distance without a single breakdown.

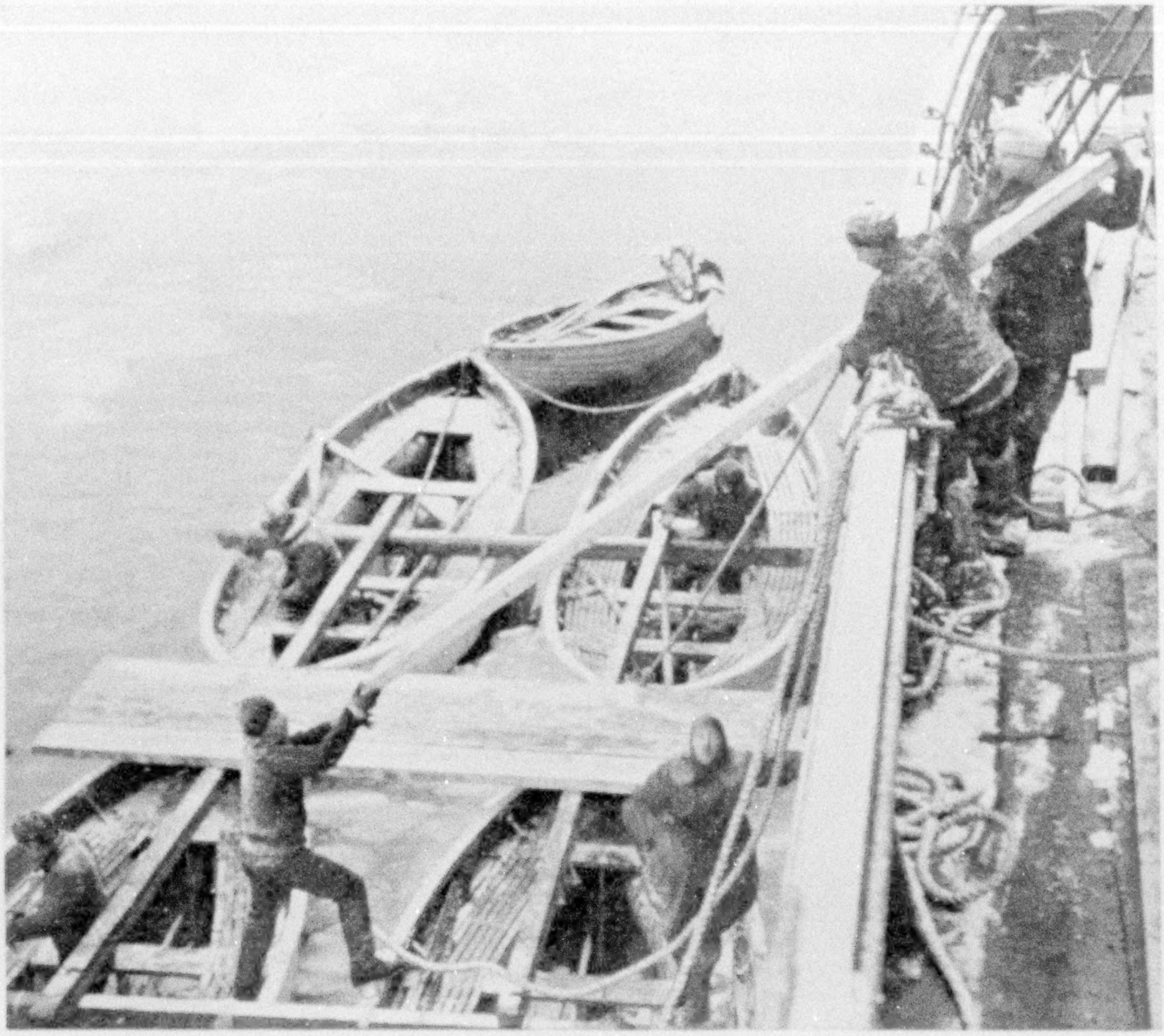
We arrived at Kings Bay at 4 p. m., April 29, and found the Amundsen-Ellsworth-Nobile Expedition members well under way in their preparation to receive the great Italian dirigible *Norge.*

This revelation of the energy of another air expedition had a tonic effect on the eager young American spirit of our crew.

PLANE FERRIED TO LAND THROUGH ICE-CHOKED HARBOR

Fate lost no time in placing serious obstacles in our path. The little harbor of Kings Bay was choked with ice, but skillful work by Captain Brennan brought the *Chantier* to anchor within 300 yards of the shore.

By laying heavy planks across the gunwales of our whaleboats we constructed a big raft. It began to snow; and the air was cold and raw as we worked at top



BUILDING THE PONTOON RAFT ON WHICH THE PLANE WAS TAKEN ASHORE

But another example of the resourcefulness of the American seaman in an emergency.

speed to meet the emergency of a landing that was far from safe.

The First Mate hoisted the body of the *Josephine Ford* from the ship's hold in a swirl of flakes. A change in tide began to close the lane we had opened among the heavy cakes of ice that blocked our course ashore.

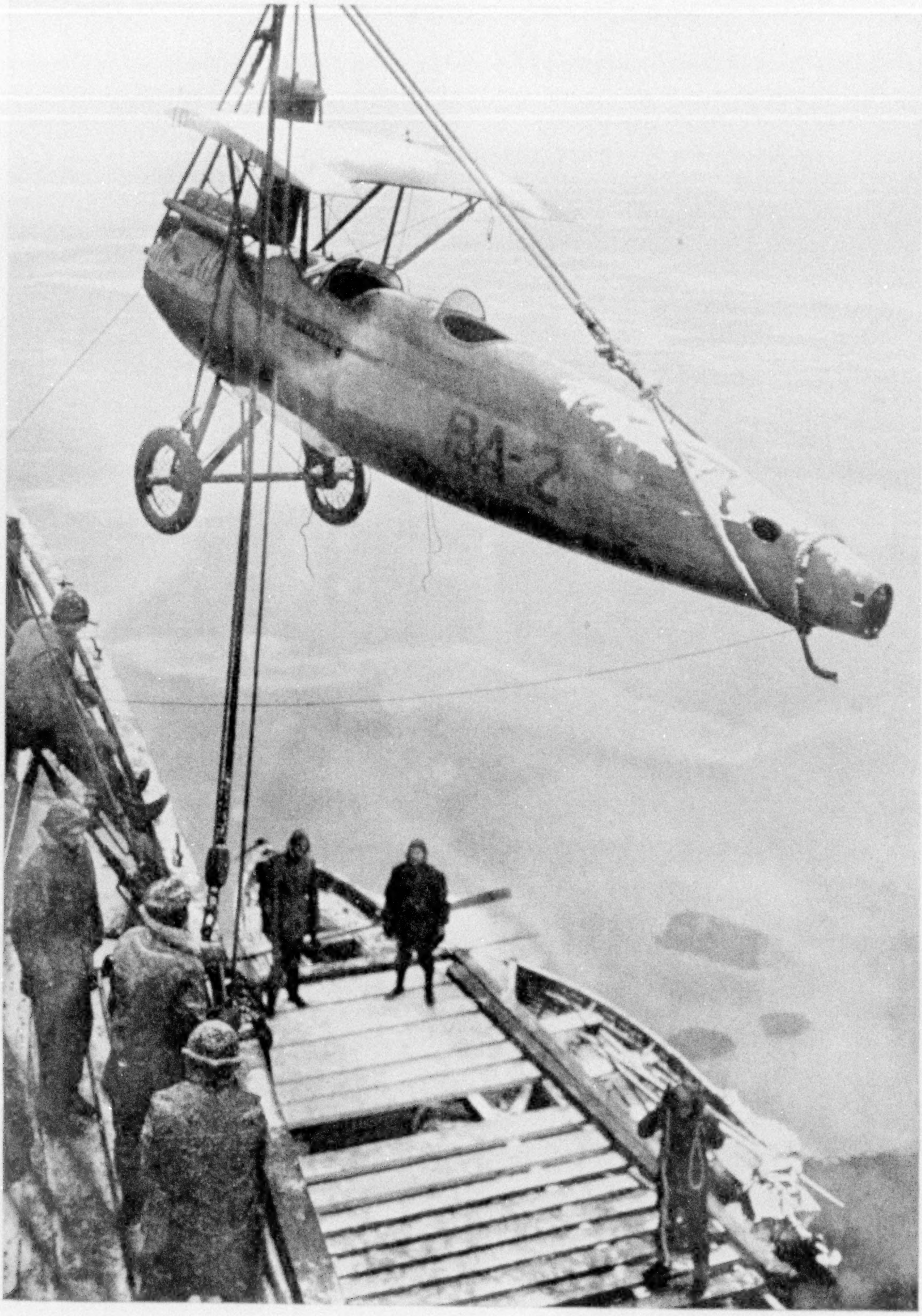
Yet by tireless work and unswerving determination, our men managed to prop the awkward body of the plane on its frail support, and ferried it in safety to the rugged tide-crack on the beach. We were taking a tremendous chance in doing this, for had a wind sprung up, the pontoon would have been crushed or blown out to sea.

No wage or ordinary urge could have evoked such enthusiastic industry and courage as the men displayed during those first two nerve-racking days.

We had plenty of narrow escapes, especially for the plane and equipment. For example, just as we were about to hoist the wings out and bolt them on the body now waiting on its raft, the wind rose and threatened the safety of the whole structure. We had to secure the great wing firmly to the deck of the ship to prevent it being blown away. As we had only one plane for our polar flight, a serious accident at this juncture would have been fatal to the whole project.

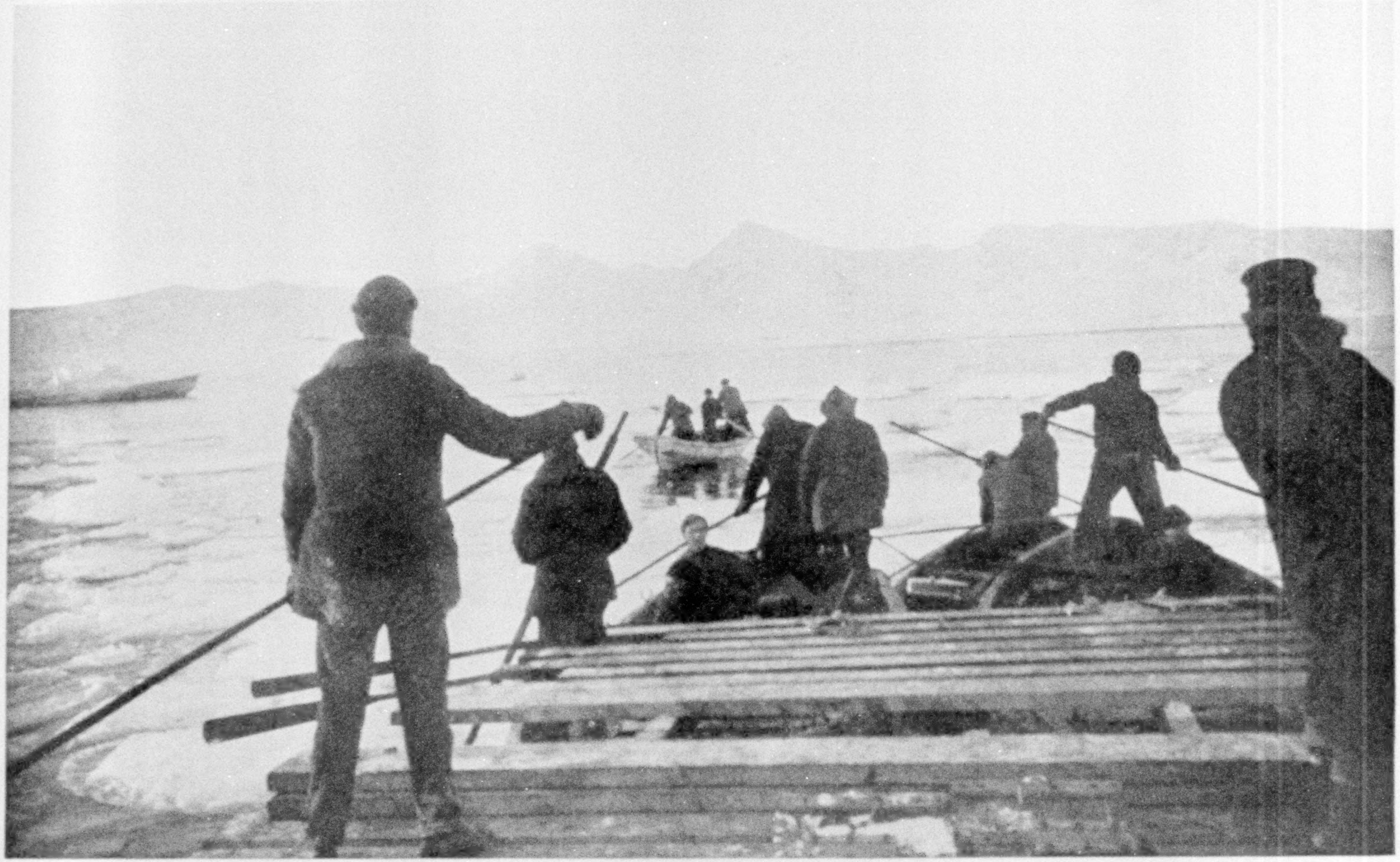
READY FOR FLIGHT

A field-kitchen was put up in the vicinity of the plane and meals were cooked and served in the open as we worked. Fuel-drums were hauled up by hand, heavy parts brought alongside, equipment and instruments for the flight assembled near by under cover, and all was made



THE RELIEF PLANE BEING LOWERED TO THE IMPROVISED RAFT

Note the snow-covered clothing of the men engaged in the landing operations. This plane was not only prepared to go to the relief of the big polar plane in the event of disaster, but was also used in making motion pictures of the flight.



SURVEYING THE HAZARDS OF THE HARBOR

An insignificant squall sweeping over the ice-filled waters of Kings Bay at the time that the big monoplane was being transported on its raft from the side of the *Chantier* to the shore would have wrecked all the plans of the Expedition. This scene recalls the great painting of Washington Crossing the Delaware.

ready for a hop-off the minute we felt it safe to hazard a full flight.

The plane's first attempt to take off for a trial flight ended in a snowdrift and nearly upset—which would have upset the Expedition as well! A ski was broken to bits and the landing gear bent.

Things then looked black, but the men refused to lose heart. A repair gang worked all night installing new skis, whose strength was doubled by using some old oars. There was no other hard wood available in all Kings Bay.

Meanwhile, the rest of the crew worked at the muscle-tearing task of leveling off the mile-long slide of snow down which we had to run for the take-off.

Profiting by our first experience, we treated the bottom of the skis with a mixture of rosin and tar. The runway was fairly smooth for the second attempt and the plane was lightly loaded. Bennett took the wheel and "gave her the gas." We held our breath.

SUCCESS OF TRIAL FLIGHT REVISED PLANS

This time our airplane moved forward rapidly, then rose gracefully into the air. With Lieutenant Noville and Lieutenant Parker aboard, in addition to Bennett, she made a trial flight of more than two hours and showed a remarkably low gas consumption. The cold-weather cowling on the engines came up to our highest expectations. Our worst fears were at an end.

At this point came a complete and sudden reversal of our plans. The trial flight showed that we could probably take off the snow with sufficient fuel to visit Cape Morris Jesup and the Pole in one non-stop flight.

We had planned and announced that we would explore this Cape, the northernmost point of known land in the world. It had been our intention to land there and use it as a halfway station, after putting down a base with supplies.

But since we could explore the whole distance without landing, the question naturally arose, "Why not go direct to the Pole and return via Cape Morris Jesup?" Especially since landing with skis in strange areas meant taking big risks. So it was decided.

Final preparations were completed on May 8. W. C. Haines, a meteorologist loaned us by the U. S. Weather Bureau, told us that the weather was right.

We warmed the motors; put the last bit of fuel and food aboard; examined our instruments with care. Bennett and I climbed in and we were off. Off, but alas, not up!

Our load proved too great, the snow too "humpy," the friction of the skis too strong a drag. The plane simply would not get into the air.

We got off the end of the runway at a terrific speed, jolted roughly over several snow hummocks and landed in a snowdrift, coming within an ace of upsetting, which, of course, would have smashed the plane.

A dozen of our men ran up to us weary, heartsick, and speechless. I waded through the deep snow to the port landing gear. Great! Both it and the ski were O. K. Then I stumbled to the other side and found that they also had stood the terrible pounding.

My apprehension turned to joy, for I knew that if the landing apparatus would stand that strain we would eventually take off for the Pole with enough fuel to get there!

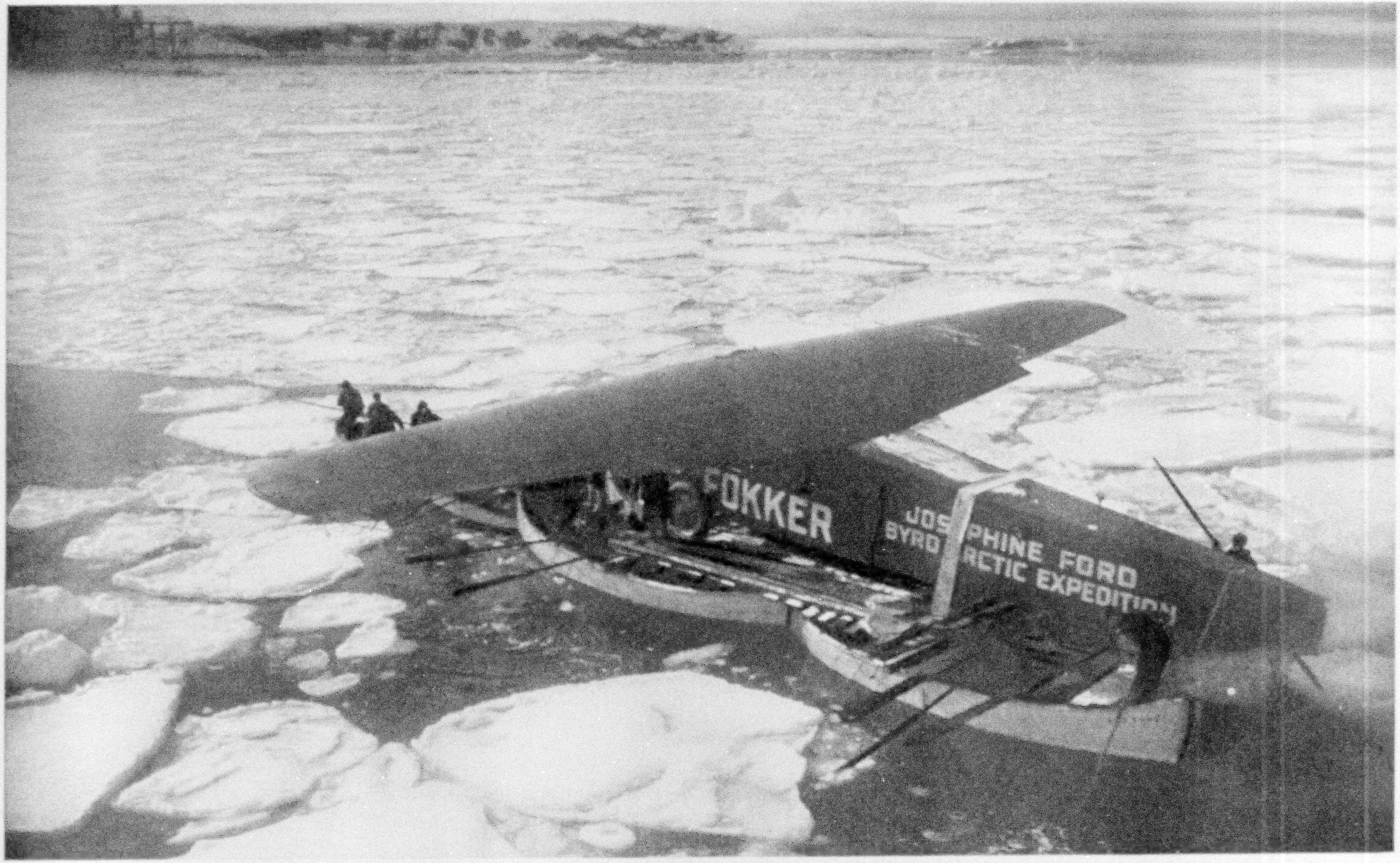
We took off hundreds of pounds of fuel to lighten the load; dug out of the snowdrift and taxied the *Josephine Ford* up the hill to try again. We held another council, and concluded to work through the night lengthening and smoothing the runway. At the same time we would take out of the plane as much equipment as we could spare, and attempt a take-off with less fuel.

The weather was still perfect. We decided to try to get off as near midnight as possible, when the night cold would make the snow harder and therefore easier to take off from. Finally, at a half hour past midnight Greenwich time, all was in readiness to go. Bennett and I had had almost no sleep for 36 hours, but that did not bother us.

There lay the sun in the general direction of our goal, beckoning us on.

Dr. O'Brien and Captain Brennan begged us to get a good sleep before making another attempt. But our opportunity was at hand.

We carefully iced the runway in front of the skis (so that we could make a quick start), while Bennett made his motor


FOKKER
JOS PHINE FORD
BYRD RCTIC EXPEDITION

THE MONOPLANE MAKING ITS WAY ON A RAFT FROM THE "CHANTIER" TO ITS BASE AT SPITSBERGEN

Several men, standing in the bow of a rowboat which precedes the raft made of four whaleboats lashed together, are clearing a way through the pan ice.

preparations. The crew put the finishing touches on the runway.

Bennett came up for a last talk and we decided to stake all on getting away—to give the *Josephine Ford* full power and full speed.

A few handclasps from our comrades and we set our faces toward our goal and the midnight sun.

OFF FOR THE BIG ADVENTURE

We raced down that runway. The rough snow ahead loomed near but we never reached it. We were off for our great adventure!

Beneath us were our shipmates—every one anxious to go along, but unselfishly wild with delight that we were at last off—running in our wake, waving their arms, and throwing their hats in the air.

As long as I live I can never forget that sight, or those splendid fellows. They had given us our great chance.

Utmost attention had been paid for months previous to this hour to every detail that would assure our margin of safety in case of accident, and the perfection of our scientific results in the case of success.

We had a short-wave radio set operated by a hand dynamo, should we be forced down on the ice. A handmade sledge was also stowed in the fuselage, on which to carry our food and clothing should we be compelled to walk to Greenland.

We had food for ten weeks. Our main staple, pemmican, consisting of chopped-up dried meat, fat, sugar and raisins, was supplemented by chocolate, pilot-bread, tea, malted milk, powdered chocolate, butter, sugar and cream cheese, all of which form a highly concentrated diet.

Other articles of equipment were a rubber boat for crossing open leads if forced down, reindeer-skin, polar-bear and seal fur clothes, boots and gloves, primus stove, rifle, pistol, shotgun and ammunition; tent, knives, ax, medical kit and smoke bombs—all as compact as humanly possible.

The first stage of our navigation was the simple one of dead reckoning, or following the well-known landmarks in the vicinity of Kings Bay, which we had just left.

We climbed to 2,000 feet to get a good view of the coast and the magnificent snow-covered mountains inland.

Within an hour of taking the air we passed the rugged and glacier-laden land and crossed the edge of the polar ice pack. It was much nearer to the land than we had expected. Over to the east was a point where a foot-traveler could have walked from the ice pack on to the land.

We looked ahead at the ice pack, gleaming in the rays of the midnight sun—a fascinating scene whose lure had drawn famous men into its clutches, never to return. It was with a feeling of exhilaration that we felt that for the very first time in history two mites of men could gaze upon her charms, and discover her secrets, out of reach of those sharp claws.

Perhaps! There was still that "perhaps," for if we should have a forced landing disaster might easily follow.

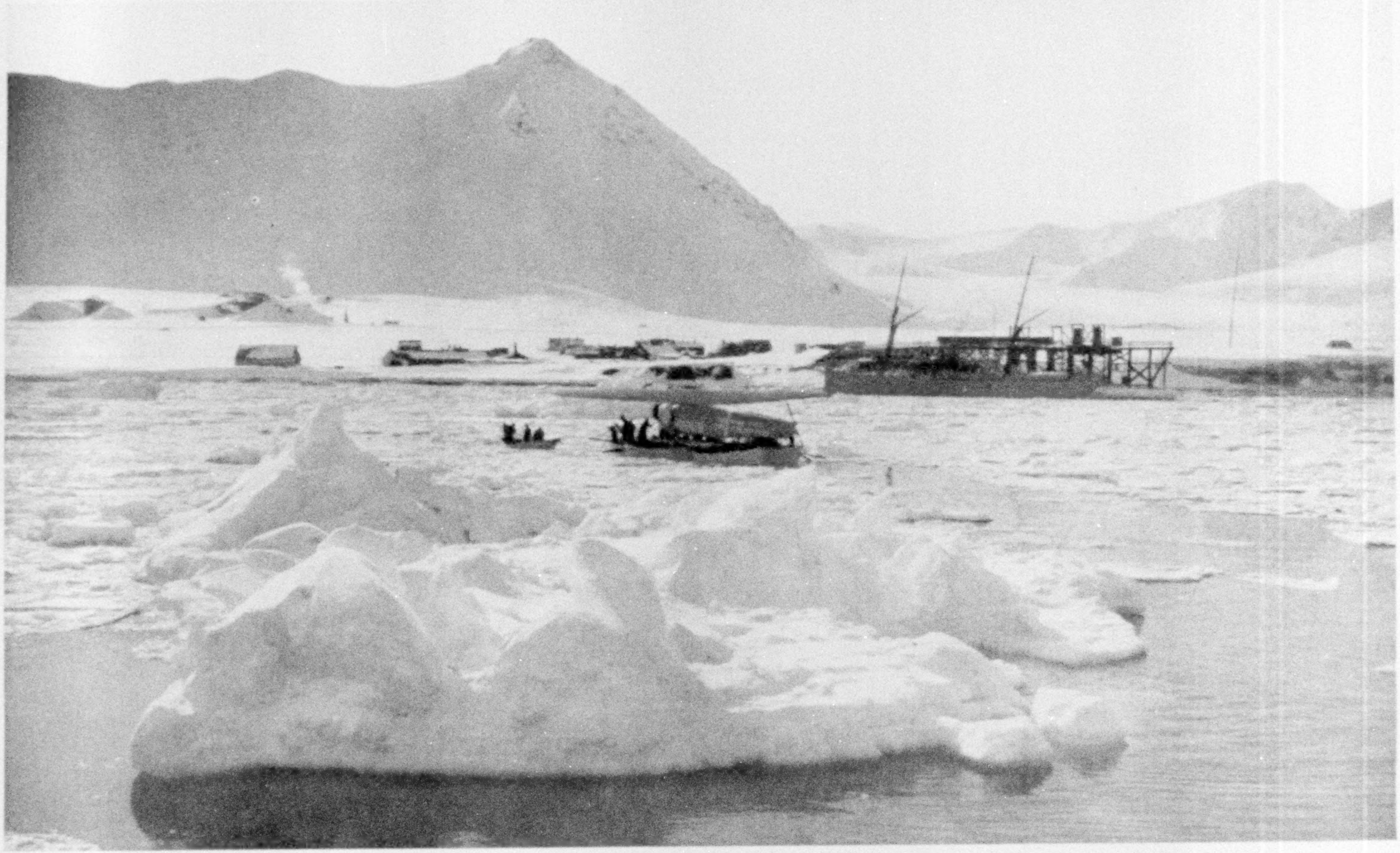
Up to the time we started no one had ever navigated an aircraft with accuracy to a distant point in the Polar Sea, and we naturally wondered if we could do it. Riiser-Larsen, of the Amundsen-Ellsworth Expedition, had navigated back to land after the party had been lost, which demonstrated that it could be done.

Though it was important to hit the Pole from the standpoint of achievement, it was more important to do so from that of our lives, so that we could get back to Spitsbergen, a target none too big. We could not fly back to land from an unknown position. We must put every possible second of time and our best concentration on the job of navigating, of flying a straight course.

DIFFICULTIES OF NAVIGATING OVER THE POLAR SEA

There are no landmarks on the ice, and so Polar Sea navigation by aircraft is similar to that on the ocean, where there is nothing but sun and stars and moon with which to determine one's position. The altitude above the sea horizon of one of these celestial bodies is taken with the sextant.

Then, by mathematical calculations, requiring an hour or so to work out, the ship is located somewhere on an imaginary line. The Polar Sea horizon, however, can not always be depended upon, due to the roughness of the ice. Therefore we had a specially designed instrument that would enable us to take the altitude without the horizon.



THE BOAT RAFT, WITH ITS PRECIOUS PLANE BURDEN, NEARING THE SHORE

In the right background is a vessel tied up at the only dock in Kings Bay. Its unavoidable presence prevented the *Chantier* from landing the plane directly on the shore. The safe transportation of the airplane and its equipment ashore was a distinct achievement in seamanship.

Then, should the navigator of a fast airplane take an hour to get his line of position, he would be a hundred miles or so away from the point at which he took the sight.

He must therefore have quick means of making his astronomical calculations.

We were familiar with one which takes advantage of some interesting astronomical conditions existing at the North Pole.* It is a graphical method that does away largely with mathematical calculations, so that the entire operation of taking the altitude of the sun and laying down the line of position could be done in a few minutes.

So much for the locating of position in the Polar Sea by astronomy, which must be done by the navigator to check up and correct the course steered by the pilot. The compass is generally off the true course a greater or less degree, on account of faulty steering, currents, wind, etc.

Our chief concern was to steer as nearly due north as possible. This could not be done with the ordinarily dependable magnetic compass, which points only in the general direction of the North Magnetic Pole rather than the north geographical Pole.

The North Magnetic Pole lies more than a thousand miles south of the North Pole on Boothia Peninsula, Canada.

If the compass pointed exactly toward the Magnetic Pole, the direction the needle would point could be calculated mathematically for any place on the Polar Sea; but there is generally some local condition affecting the needle, so that the variation of the compass from true north can be found only by actual trial.

Since this trial could not have been made over unknown regions, the true directions the compass needle would point along our route were not known. Also, since the directive force of the earth's magnetism is small in the Far North, there is a tendency of the needle toward sluggishness in indicating a change in direction of the plane, and toward undue swinging after it has once started to move.

Nor would the famous gyroscopic compass work up there, as when nearing the Pole its axis would have a tendency to point straight up in the air.

THE SUN-COMPASS TAKES THE EXPEDITION TO THE POLE

There was only one thing to do—to depend upon the sun. We had to use a sun-compass.

This instrument was invented and constructed for our use by Albert H. Bumstead, chief cartographer of the National Geographic Society. I do not hesitate to say that without it we could not have reached the Pole; it is even doubtful if we could have hit Spitsbergen on our return flight.

Of course, the sun was necessary for the use of this compass. Its principle is a kind of a reversal of that of the sundial. In the latter, the direction of north is known and the shadow of the sun gives the time of day.

With the sun-compass, the time of day is known, and the shadow of the sun, when it bisects the hand of the 24-hour clock, indicates the direction of north (or any other desired).

Then there was the influence of the wind that had to be allowed for. An airplane, in effect, is a part of the wind, just as a ship in a current floats with the speed of the current.

If, for example, a thirty-mile-an-hour wind is blowing at right angles to the course, the plane will be taken 30 miles an hour to one side of its course.

This is called the "drift" and can be corrected by an instrument called the drift-indicator, which we had developed for the first naval transatlantic flight.*

We used the drift-indicator through the trapdoor in the plane, and had so arranged the cabin that there was plenty of room for navigating. There was also a fair-sized chartboard.

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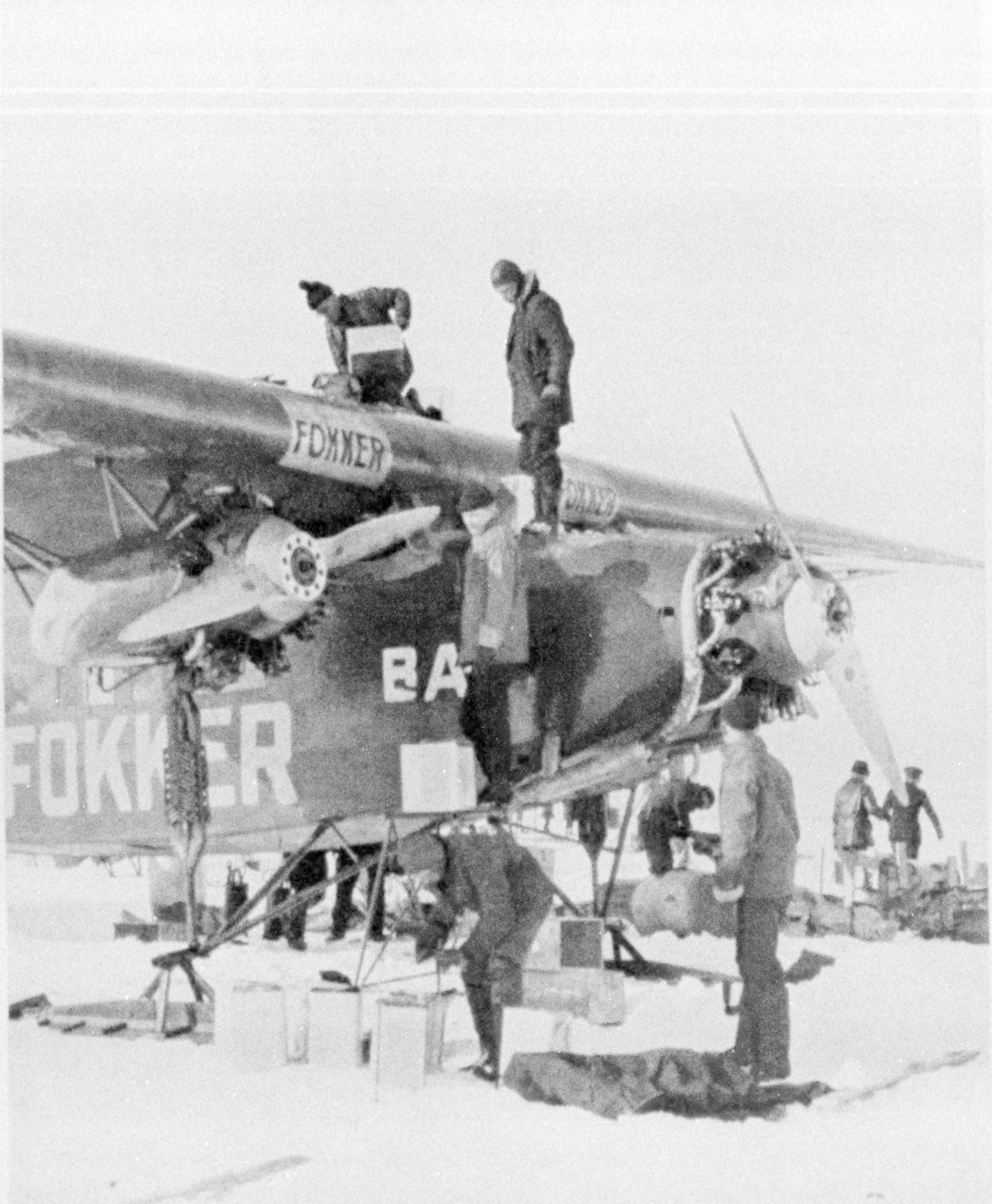
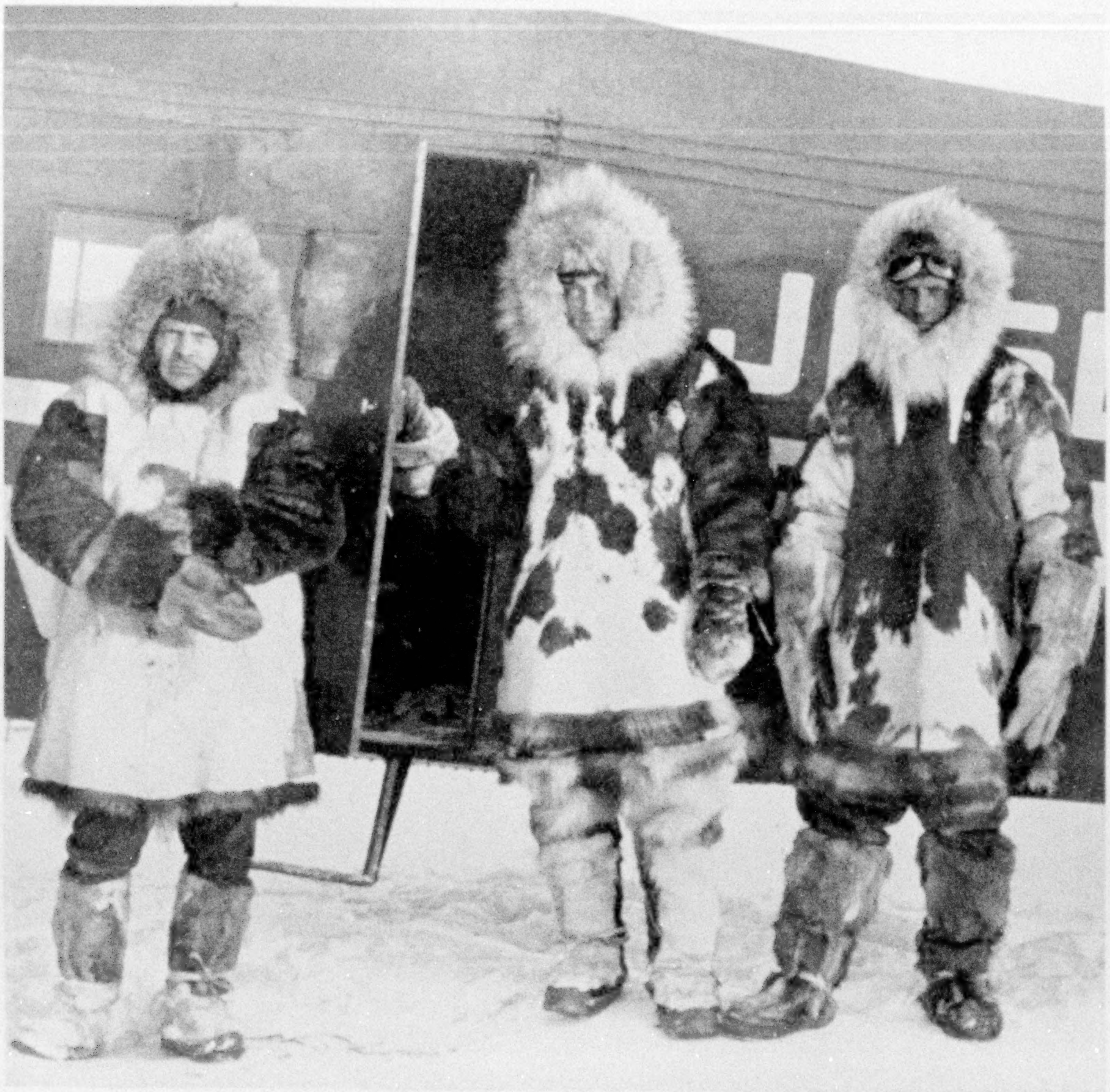
*AUTHOR'S NOTE.—This method was taught us by Hydrographic Engineer G. W. Littlehales, of the Navy Department. It is an interesting fact that Arthur R. Hinks, M.A., F.R.S., Secretary of the Royal Geographical Society of England, explained this method as it could be used near the North Pole most lucidly in the Society's Journal in 1910. So far as I know, he is the first person to call attention to the method.

*Commander Byrd was in charge of the navigation preparations for the transatlantic flight of the *NC* flying boats, during which the *NC-4* was the first craft to cross the Atlantic in the air.



FUELING THE PLANE FOR THE HISTORIC FLIGHT

The main gasoline supply for the trip was contained in tanks built inside the single wing of the plane. Note the shock-absorber device connected with the ski in the foreground (see, also, illustration, page 370). The motors of Commander Byrd's plane were air-cooled, thus materially lessening the weight and relieving the explorer of any anxiety as to the freezing of water in the radiators.



ENTERING THE PLANE FOR THE FLIGHT TO THE POLE

Commander Byrd is in the center with Aviation Pilot Floyd Bennett at his left; Lieut. G. O. Noville at the reader's left. The explorer and his associate are wearing parkas, which were shipped from Nome, Alaska, and were brought 500 miles to Fairbanks by dog team. The parkas are of reindeer skin with an inner parka of squirrel skin. The trousers are of polar-bear skin with the fur outside, and the boots are of reindeer skin lined with sheepskin shearling. The gloves are of reindeer skin lined with fur.

Exact Greenwich time was necessary, so we carried two chronometers that I had kept in my room for weeks. I knew their error to within a second. There seems to be a tendency for chronometers to slow up when exposed to the cold, so we had taken their cold-weather error.

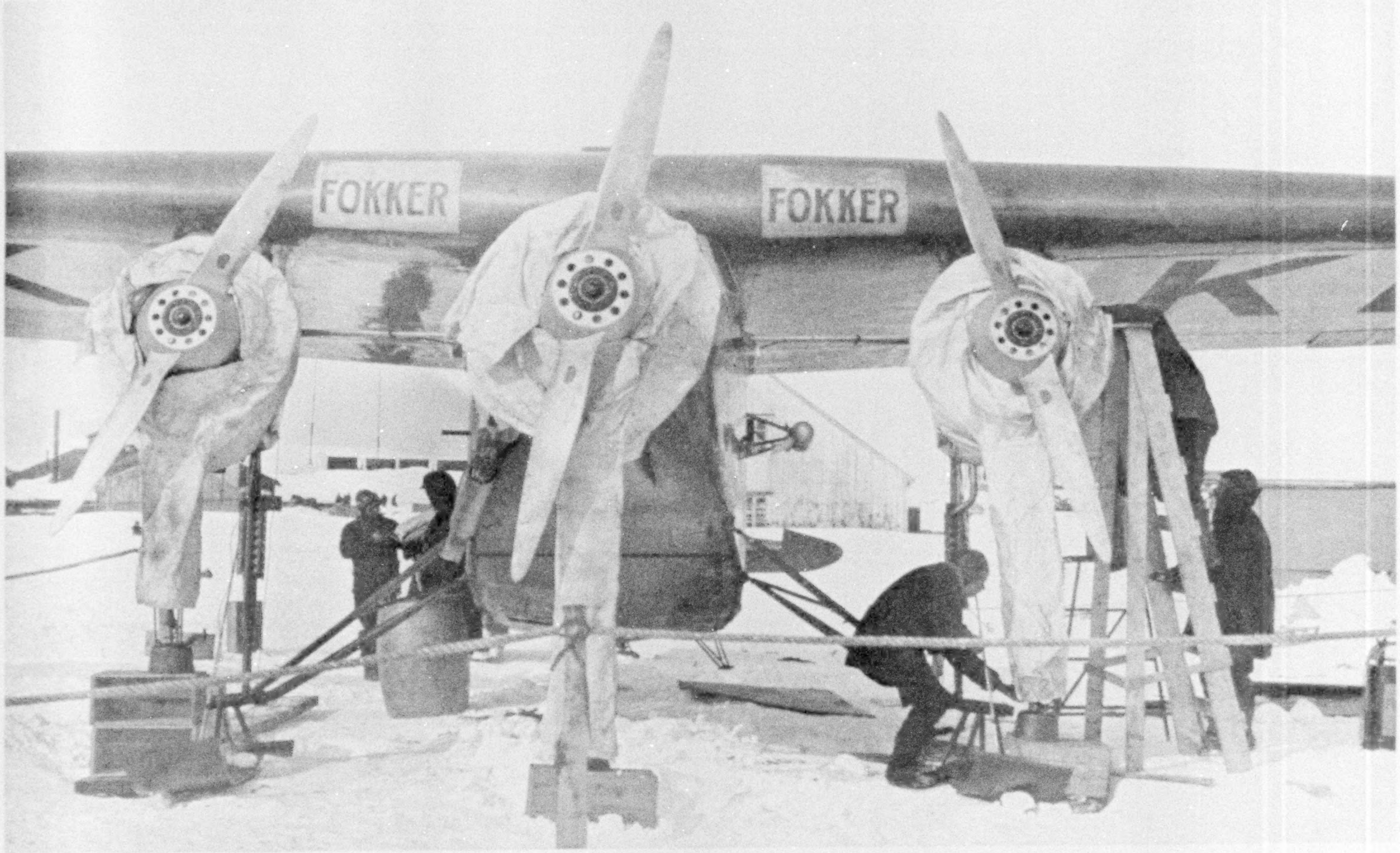
THE LAST LINK WITH CIVILIZATION

As we sped along over the white field below I spent the busiest and most concentrated moments of my life. Though we had confidence in our instruments and methods, we were trying them for the first time over the Polar Sea.

First, we obtained excellent north and south bearings on a mountain range on Spitsbergen which we could see for a long distance out over the ice. These checked with the sun-compass.

We could see mountains astern gleaming in the sun at least a hundred miles behind us. That was our last link with civilization. The unknown lay ahead.

Bennett was steering, and for some unaccountable reason the plane veered from



WARMING UP THE MOTORS OF THE POLAR PLANE

The heat of three small gasoline stoves is conducted to the motors through tubes of fireproof canvas. This heat is necessary before the planes can be started. On the right side of the fuselage is the radio apparatus, and to the right of the left-hand motor may be seen the shock-absorber device connecting the ski to the plane (see, also, illustration, page 368).

the course time and time again, to the right. He could glance back where I was working, through a door leading to the two pilots' seats.

Every minute or two he would look at me, to be checked if necessary, on the course by the sun-compass. If he happened to be off the course I would wave him to the right or left until he got on it again.

WIND DRIFT AND GROUND SPEED CHECKED

Once every three minutes I checked the wind drift and ground speed, so that in case of a change in wind I could detect it immediately and allow for it.

We had three sets of gloves which I constantly changed to fit the job in hand, and sometimes removed entirely for short periods to write or figure on the chart.

I froze my face and one of my hands in taking sights with the instruments from the trapdoors. But I noticed these frostbites at once and was more careful in the future. Ordinarily a frostbite need not be dangerous if detected in time and if the blood is rubbed back immediately into the affected parts.

We carried two sun-compasses. One was fixed to a trapdoor in the top of the navigator's cabin; the other was movable, so that when the great wing obscured the sun from the compass on the trapdoor, the second could be used inside the cabin, through the windows.

Every now and then I took sextant sights of the sun to see where the lines of position would cross our line of flight. I was very thankful at those moments that the Navy requires such thorough navigation training, and that I had made air navigation my hobby.

Finally, when I felt certain we were on our course, I turned my attention to the great ice pack, which I had wondered about ever since I was a youngster at school. We were flying at about 2,000 feet, and I could see at least 50 miles in every direction. There was no sign of land. If there had been any within 100 miles' radius, we could have seen its mountain peaks, so good was the visibility.

I noted that the temperature was 8 degrees above zero—only 24 below freezing. This was not so low as might be expected, but it was getting colder as we sped north.

The ice pack beneath was crisscrossed with pressure ridges, but here and there were stretches that appeared long and smooth enough to land on. However, from 2,000 feet the snow may be very deceptive, as we had learned.

The pressure ridges that looked so insignificant from the plane varied from a few feet to 50 or 60 feet in height, while the average thickness of the ice was about 40 feet. A flash of sympathy came over me for the brave men who had struggled northward over that cruel mass.

We passed leads of water recently opened by the movement of the ice, and so dangerous to the foot traveler, who never knows when the ice will open up beneath and swallow him into the black waters of the Polar Sea.

I now turned my mind to air conditions, for I knew they were a matter of interest to all those contemplating the feasibility of a polar airway. We found them very good.

AIR CONDITIONS WERE FAVORABLE

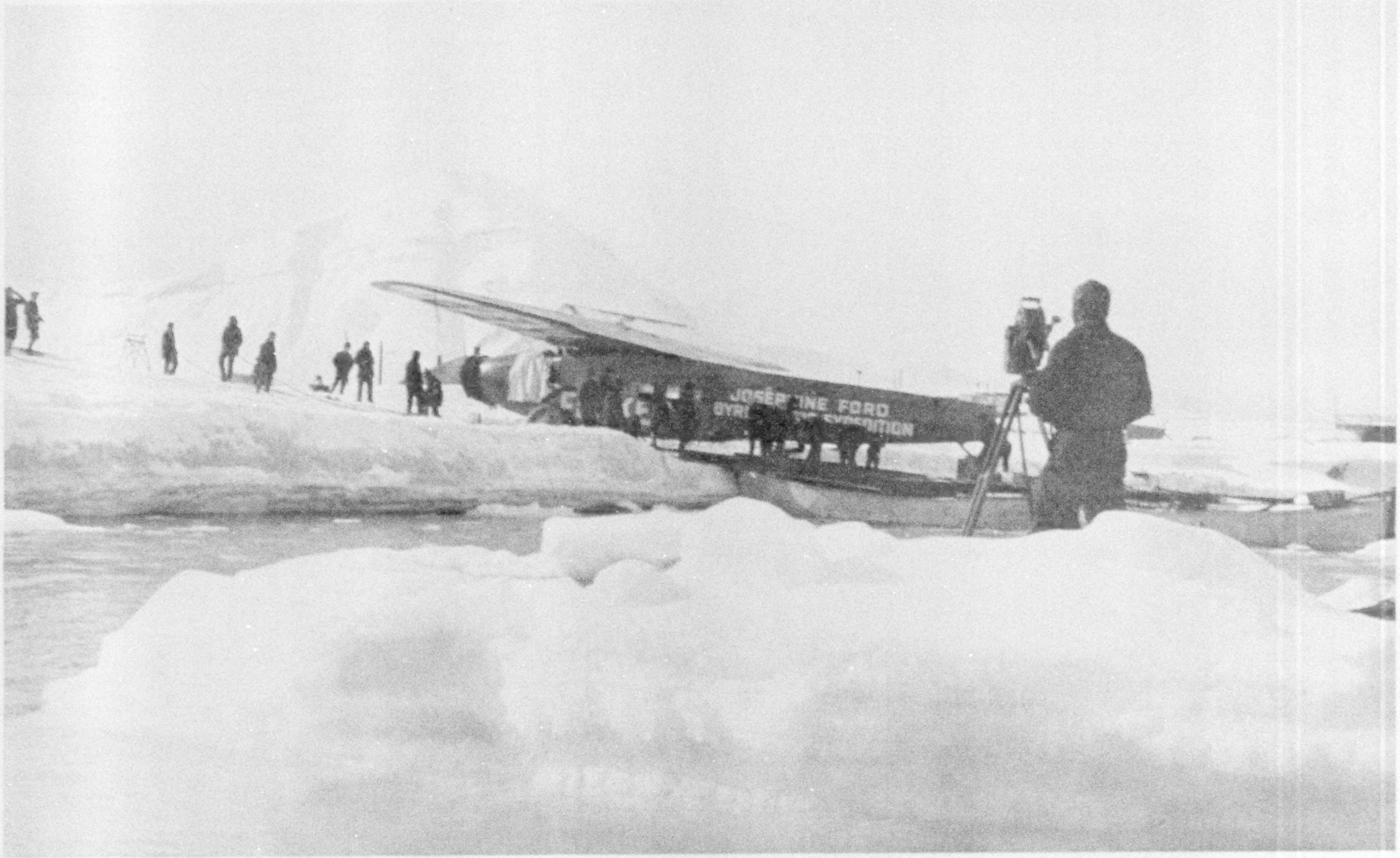
There were no bumps in the air. This was as we had anticipated, for the flatness of the ice and the Arctic temperature are not conducive to air currents, such as are sometimes found over land. Had we struck an Arctic gale, I cannot say what the result would have been as far as air roughness is concerned. Another advantage of spring and summer flying would be the 24-hour daylight.

It was time now to relieve Bennett at the wheel, not only that he might stretch his legs, but so that he could pour gasoline into the tanks from the five-gallon tins stowed all over the cabin. Empty cans were thrown overboard to get rid of the weight, small though it was.

Piloting was not difficult because of the smoothness of the air, and I was able to check myself on the course by holding the sun-compass in one hand and steering with the other.

I had time now leisurely to examine the ice pack and eagerly sought signs of life, a polar bear, a seal, or birds flying, but could see none.

On one occasion, as I turned to look over the side, my arm struck some object in my left breast pocket. It was filled with good-luck pieces!



LANDING THE BYRD POLAR PLANE AT SPITSBERGEN

The danger of accident to the all-important plane was present during every minute of its transshipment from ship to icy shore. The motion-picture operator in the foreground has had to set up his tripod on a small iceberg.

I am not superstitious, I believe. No explorer, however, can go off without such articles. Among them was a religious medal put there by a friend. It belonged to his fiancée and he firmly believed it would get me through. There was also a tiny horseshoe made by a famous blacksmith. Attached to the pocket was a little coin taken by Peary, pinned to his shirt, on his trip to the North Pole.

SUFFERS ATTACK OF SNOW BLINDNESS

When Bennett had finished pouring and figuring the gasoline consumption, he took the wheel again, and I went back to the incessant navigating. So much did I sight down on the dazzling snow that I had a slight attack of snow blindness. But I need not have suffered, as I had brought along the proper kind of amber goggles.

Twice during the next two hours I relieved Bennett at the wheel. When I took it the third time, he smiled as he went aft. "I would rather have Floyd with me," I thought, "than any other man in the world."

My mind turned back to our first Arctic expedition when we were flying between two great mountains, looking down into jagged regions never before seen by man. Ages of glacial ice had chiseled the land into grotesque, stupendous formations. An Arctic gale had sprung up and tossed the plane about with sickening jolts.

We were again getting into areas never before viewed by mortal eye. The feelings of an explorer had superseded the aviator's now, and I had that extraordinary exhilaration that comes from looking into virgin territory. At that moment I felt that we were repaid for our risk.

At the end of that unknown area lay our goal, somewhere beyond the shimmering horizon. We were opening unexplored regions at the rate of nearly 10,000 square miles an hour, and were experiencing the incomparable satisfaction of searching for new land. Once, for a moment, I mistook a distant, vague, lowlying cloud formation for the white peaks of a far-away land.

If I could explain the feeling I had at this time, the much-asked question would be answered: "What is this Arctic bug so many men get?"

The sun was still shining brightly. Surely fate was good to us, for without the sun our quest of the Pole would have been hopeless.

To the right, somewhere, the rays of the midnight sun shone down on the scenes of Nansen's heroic struggles to reach the goal that we were approaching with the ease of an eagle at the rate of ninety miles an hour.

When I went back to my navigating, I compared the magnetic compass with the sun-compass and found that the westerly error in the former had more than doubled since reaching the edge of the ice pack, where it had been eleven degrees westerly. This steadily increased all the way to the Pole.

When our calculations showed us to be about an hour from the Pole, I noticed through the cabin window a bad leak in the oil tank of the starboard motor. Bennett confirmed my fears. He wrote: "That motor will stop." It was a big moment.

Bennett suggested that we try a landing to fix the leak. But I had seen too many expeditions fail by landing, so we decided to keep on for the Pole with our two remaining motors, if necessary. We would be in no worse fix should we come down near the Pole than we would be if we had a forced landing where we were. Here again conservatism would have lost.

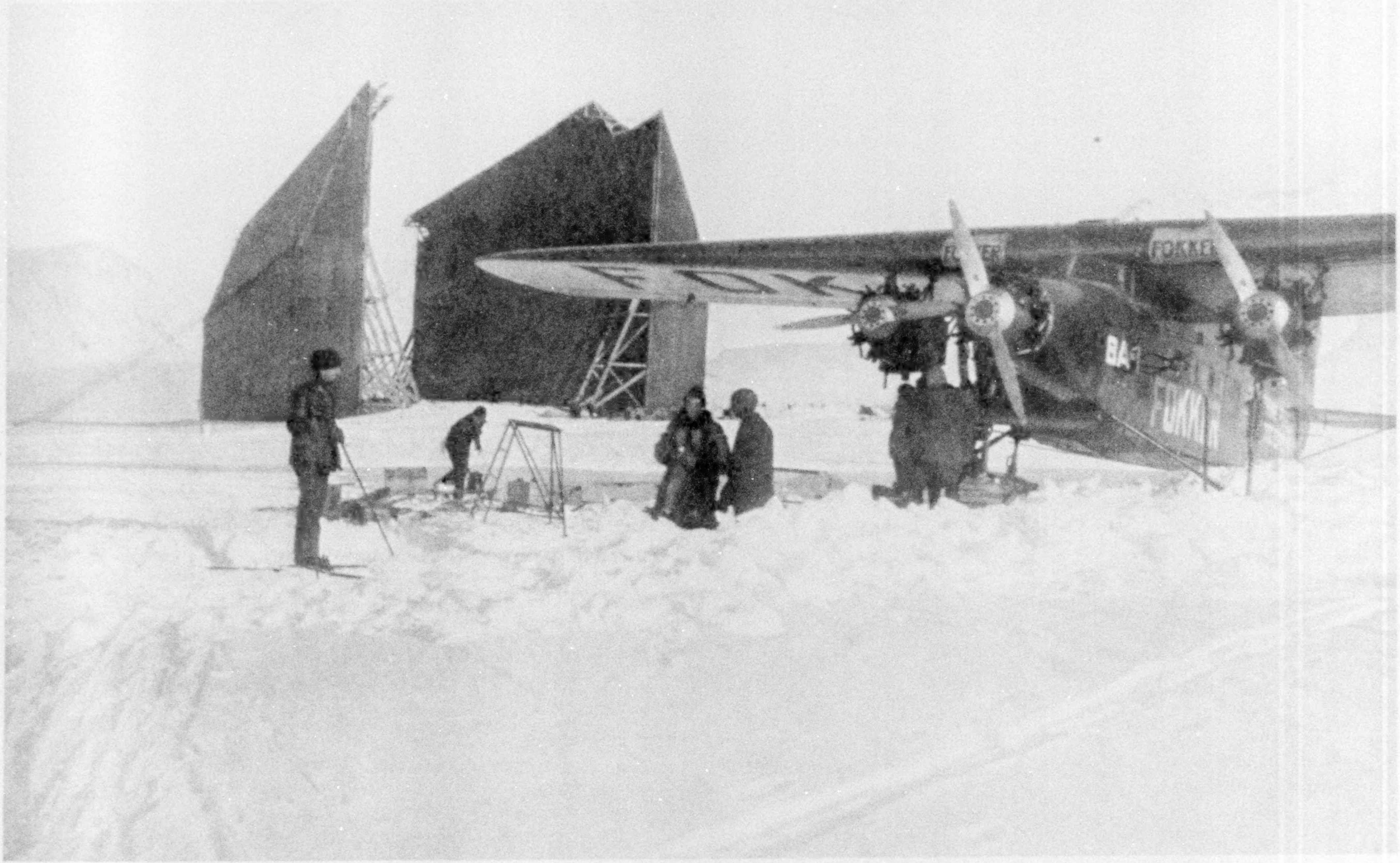
When I took the wheel again I kept my eyes glued on that oil leak and the oil-pressure indicator. Should the pressure drop, we would lose the motor immediately. It fascinated me. There was no doubt in my mind that the oil pressure would drop any moment. But the prize was actually in sight. We could not turn back.

THE POLE!

At 9:02 a. m., Greenwich civil time, our calculations showed us to be at the Pole! The dream of a lifetime had at last been realized (see, also, page 387).

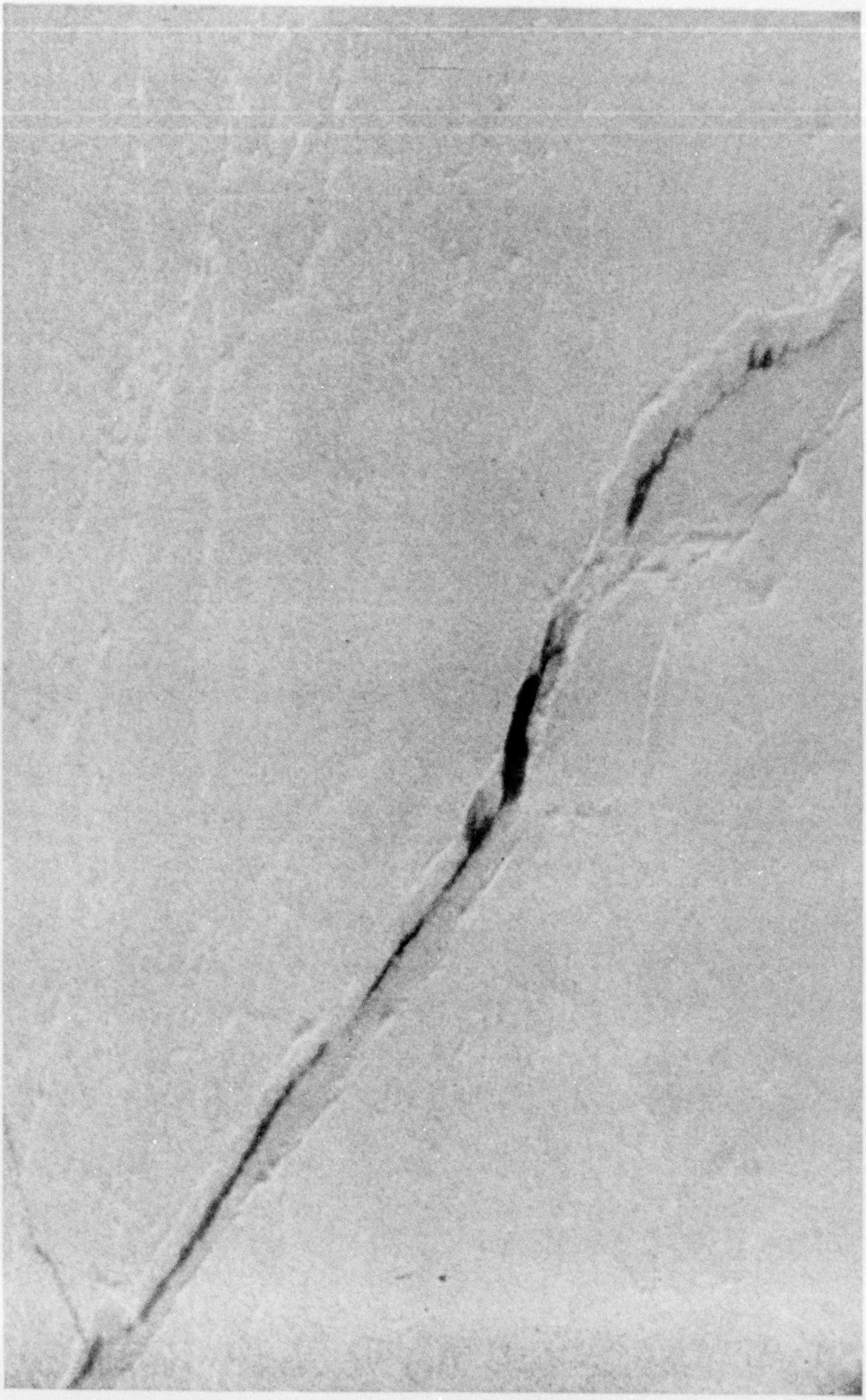
We headed to the right to take two confirming sights of the sun, then turned and took two more.

After that we made some moving and still pictures, then went on for several miles in the direction we had come, and



THE POLAR PLANE "COMES A CROPPER"

"We got off the end of the runway at a terrific speed, jolted roughly over several snow hummocks, and landed in a snowdrift" (see page 363).



Photograph by Lieut. Commander Richard E. Byrd

THE NORTH POLE AREA AS IT LOOKED FROM THE AIRPLANE made another larger circle to take in the Pole.

Time and direction became topsy-turvy at the Pole. When crossing it on the same straight line we were going north one instant and south the next! All directions became south from the Pole itself.

PEARY'S FINDINGS ARE COMPLETELY VERIFIED

As we flew there, we saluted the gallant, indomitable spirit of Peary and verified his report in every detail.

Below us were ice fields or cakes of various sizes and shapes, the boundaries of which were the ridges formed by the great pressure of one cake upon another. This showed a constant ice movement and indicated the nonproximity of land. Here and there, instead of a pressing together of the ice fields, there was a separation, leaving a water-lead which had been recently frozen over and showing green and greenish-blue against white. On some of the cakes were ice hummocks and rough masses of jumbled snow and ice.

At 9:15 a. m. we headed for Spitsbergen, having abandoned the plan to return via Cape Morris Jesup on account of the oil leak. But, to our astonishment, that motor never stopped because (as we afterward found out) the leak was caused by a rivet jarring out of its hole, and when the oil got down to the level of the hole it stopped leaking. Flight Engineer Noville had put an extra amount of oil in the tank.

The reaction of having accomplished our mission, together with the narcotic effect of the motors, made us drowsy when we were steering. I dozed off once at the wheel and had to relieve Bennett several times because of his sleepiness. But that return trip was a momentous experience.

May I quote from my impressions cabled to the United States several days after our return to Kings Bay:

"The wind began to freshen and change direction soon after we left the Pole, and in an hour we were making over 100 miles an hour.

"The elements were surely smiling that day on us, two insignificant specks of mortality flying there over that great, vast, white area in a small plane with only one companion, speechless and deaf from the motors, just a dot in the center of 10,000 square miles of visible desolation.

"We felt no larger than a pinpoint and as lonely as the tomb; as remote and detached as a star.

"Here, in another world, far from the herds of people, the smallnesses of life fell from our shoulders. What wonder that we felt no great emotion of achievement or fear of death that lay stretched beneath us, but instead, impersonal, disembodied. On, on we went. It seemed forever onward.

"Our great speed had the effect of quickening our processes, so that a minute appeared as many minutes, and I realized fully then that time is only a relative thing. An instant can be an age, an age an instant."

SPITSBERGEN'S BLEAK CLIFFS ARE A WELCOME SIGHT

We were aiming for Grey Point, Spitsbergen, and finally, when we saw it dead ahead, we knew that we had been able to keep on our course!

It was a wonderful relief not to have to navigate any more. We came into Kings Bay flying at about 4,000 feet. That tiny village was a welcome sight, but not so much as the good old *Chantier* that looked so small beneath.

I could see the steam from her welcoming and, I knew, joyous, whistle.

It seemed but a few moments until we were in the arms of our comrades, who carried us with wild joy down the snow runway they had worked so hard to make.

* * *

COMMANDER BYRD RECEIVES THE HUBBARD GOLD MEDAL

The First Explorer to Reach the North Pole by Air Receives Coveted Honor at Brilliant National Geographic Society Reception

IN THE presence of 6,000 members and friends of the National Geographic Society, including the President of the United States, members of the Cabinet, distinguished Army and Navy officers, members of Congress, ambassadors and ministers of foreign countries, and other representatives of official life in the National Capital, Commander Richard Evelyn Byrd, Jr., received The Society's Hubbard Gold Medal in the Washington Auditorium on the evening of his return to America, June 23, after his flight to the North Pole.

On the same occasion the explorer's associate, Aviation Pilot Floyd Bennett, also received a gold medal.

Only six other men have ever received the Hubbard Medal. They were Admiral (then Commander) Robert E. Peary, Capt. Roald Amundsen, Vilhjalmur Stefansson, Capt. Ernest H. Shackleton, Grove Karl Gilbert, and Capt. Robert A. Bartlett.

DR. GROSVENOR PRESENTS PRESIDENT COOLIDGE

Dr. Gilbert Grosvenor, President of the National Geographic Society, who presided at the reception, said:

"Mr. President, Mrs. Coolidge, members and friends of the National Geographic Society, we have assembled to welcome home and felicitate a member of our Society whose Arctic explorations began under its auspices and who now returns from an achievement that has filled the hearts of all Americans with pride and joy.

"To him, by unanimous vote, the Board of Trustees of the National Geographic Society, on behalf of the 1,050,000 members, have awarded the Hubbard Gold Medal, and to his assistant, also a member of The Society, a gold medal.

"For your information, I would state that the records of his flight, at his request, have been examined by a committee of the National Geographic Society and found to have been carefully and accurately kept. These records, in the opinion of the committee, substantiate in every particular the claims of our member that he attained the north apex of the globe by airplane on May 9, 1926, the first to reach the North Pole by aërial navigation.

"Three years ago, Mr. President, you honored the National Geographic Society by addressing it. We gratefully remember the occasion. We are very proud and happy to welcome you again.

"By so generously coming here tonight, you add further to the precious traditions of the National Geographic Society, as well as add great honor to the tribute which we desire to confer on one of our members because of his enterprise, sagacity, courage, and modesty—qualities which, I would respectfully suggest, your life so inspiringly illustrates in the field of statesmanship.

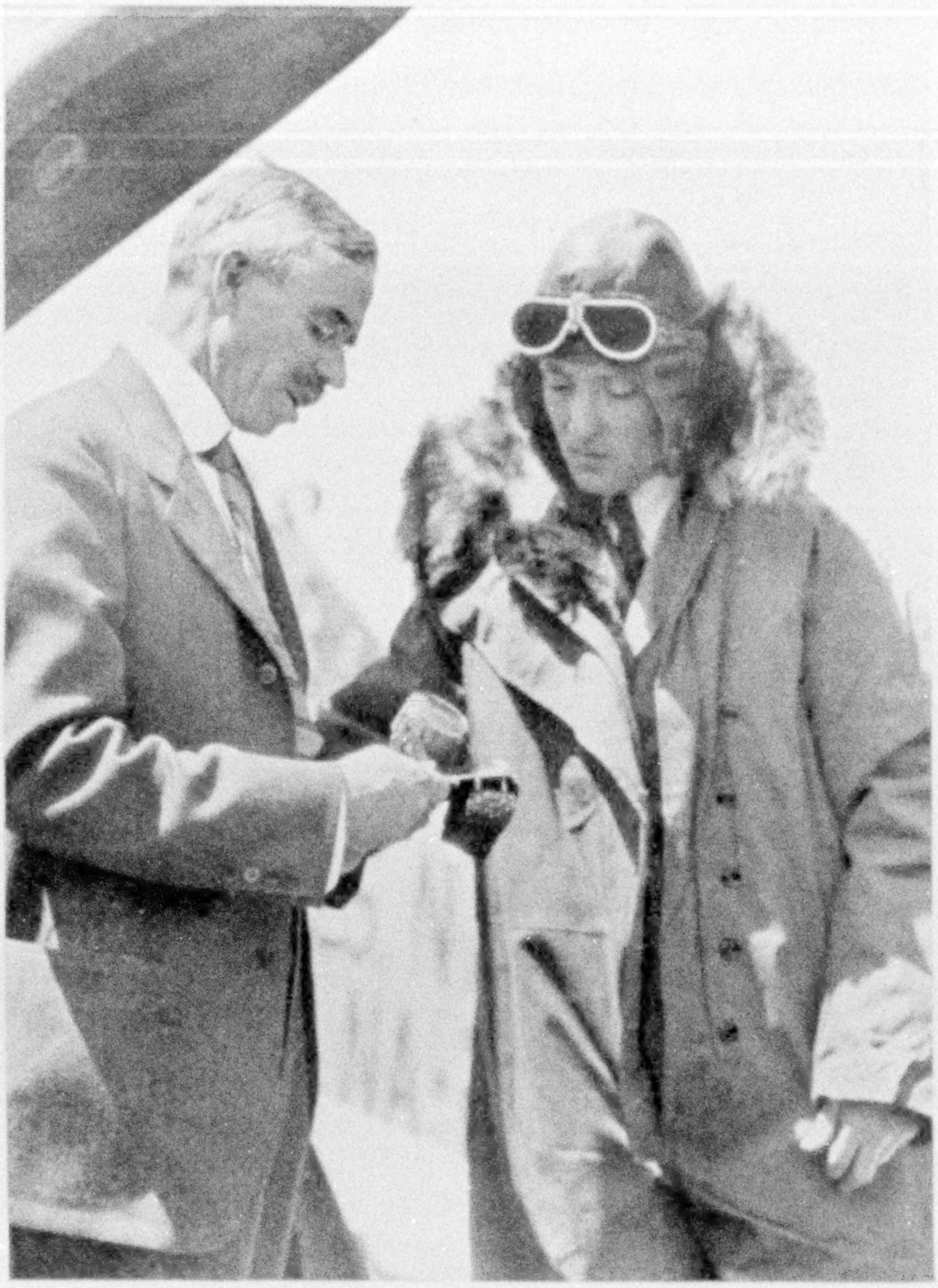
"Ladies and gentlemen, the President of the United States."

PRESIDENT COOLIDGE PRESENTS THE MEDALS

President Coolidge in presenting the medals said:

"Word that the North Pole had been reached by airplane for the first time was flashed around the globe on May 9. An American naval officer had flown over the top of the world. He had attained in a flight of fifteen hours and thirty minutes what Admiral Peary, also a representative of our Navy, achieved, seventeen years before, only after weary months of travel over the frozen Arctic wastes.

"The thrill following the receipt of this news was shared by every one everywhere. It was the spontaneous tribute to a brave man for a daring feat. We, his countrymen, were particularly proud. This man, with a record of distinguished



Photograph by Maynard Owen Williams

ALBERT H. BUMSTEAD (LEFT) AND COMMANDER BYRD EXAMINING THE SUN-COMPASS INVENTED BY THE FORMER

This instrument is independent of magnetic variations which make the ordinary mariner's compass practically useless in Arctic aviation.

service in the development of aëronautics, had by his crowning act added luster to the brilliant history of the American Navy.

"In no way could we have had a more striking illustration of the scientific and mechanical progress since the year 1909. Then Peary's trip to the Pole on dog sleds took about two-thirds of a year. He reached his goal on April 6. It was September 6 before news of the achievement reached the outside world.

"The naval officer of 1926, using an American invention, the airplane, winged his way from his base, at Kings Bay, Spitsbergen and back again in less than two-thirds of a day; and a few hours later the radio had announced the triumph to the four quarters of the earth. Scientific instruments perfected by this navigator and one by a representative of this organization were in no small degree responsible for success.

THE PRESIDENT LAUDS EXPLORER'S COURAGE

"We cannot but admire the superb courage of the man willing to set forth on such a great adventure in the unexplored realms of the air; but we must not forget, nor fail to appreciate, the vision and persistence which led him ultimately to achieve the dream of his Naval Academy days. He never ceased the effort to prepare himself mentally, scientifically, and physically to meet the supreme test. His deed will be but the beginning of scientific exploration considered difficult of achievement before he proved the possibilities of the airplane.

"Lieutenant Commander Richard Evelyn Byrd, your record as an officer and as a man is illustrious. You have brought things to pass. It is particularly gratifying to me to have this privilege of welcoming you home and of congratulating you on behalf of an admiring country, and to have the honor of presenting to you the Hubbard Medal of the National Geographic Society.

"And I take further pleasure in presenting to you, Mr. Floyd Bennett, aviation pilot, U. S. N., this medal, awarded to you by the National Geographic Society for your distinguished service in assisting and in flying to the North Pole with Mr. Byrd."

THE EXPLORER PAYS TRIBUTE TO HIS ASSOCIATES

In accepting the Hubbard Medal Commander Byrd replied:

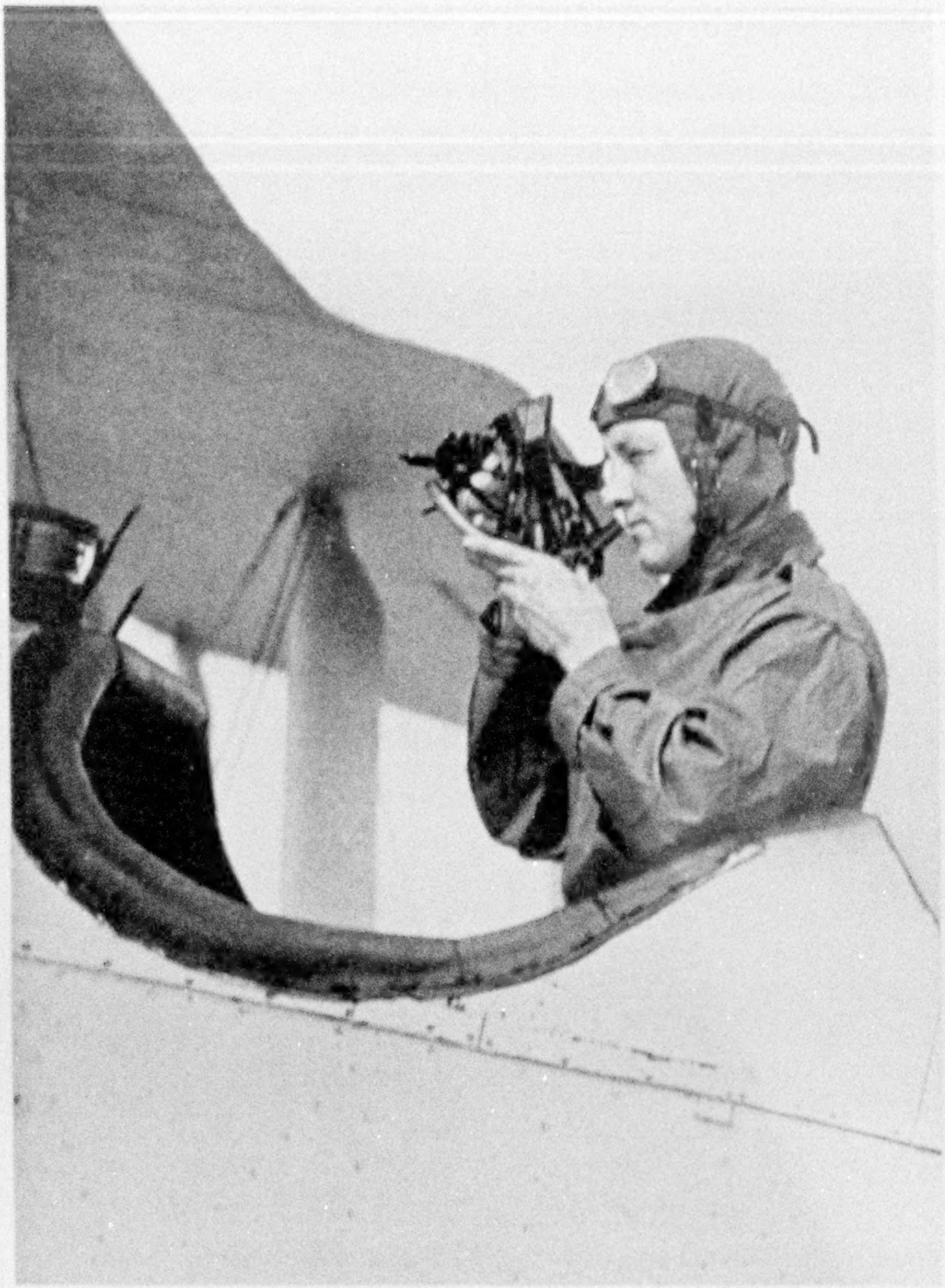
"President Coolidge, in receiving this medal I cannot but feel that I am representing the half hundred members of our Expedition. I was only one of them. So in their behalf and for our expedition's sponsors I want to express our very deep appreciation for this great honor conferred by the National Geographic Society, an honor which is a double one in being received from your hands.

"As you may recall, the MacMillan Expedition left for the Arctic, under the auspices of this Society, just a year ago, and it is interesting to note that two aviation expeditions have gone to the polar regions and returned within twelve months. Thus in a short time has been accomplished by airplane what would have otherwise occupied many years.

"I had considered myself the most fortunate of men when it was decided that I was to head the naval aviation unit that was to go with the MacMillan Expedition — that is, provided President Coolidge would approve the plan. The proposed flights were considered by some too hazardous, and it was a tremendously anxious time for me when you were making your decision, Mr. President.

"But you *did* approve the Expedition, and Secretary Wilbur, who had recommended the plan, and Dr. Grosvenor, President of the National Geographic Society, and Mr. La Gorce, its Vice-President, took a personal interest in our progress, which was most inspiring to the naval members of the Expedition.

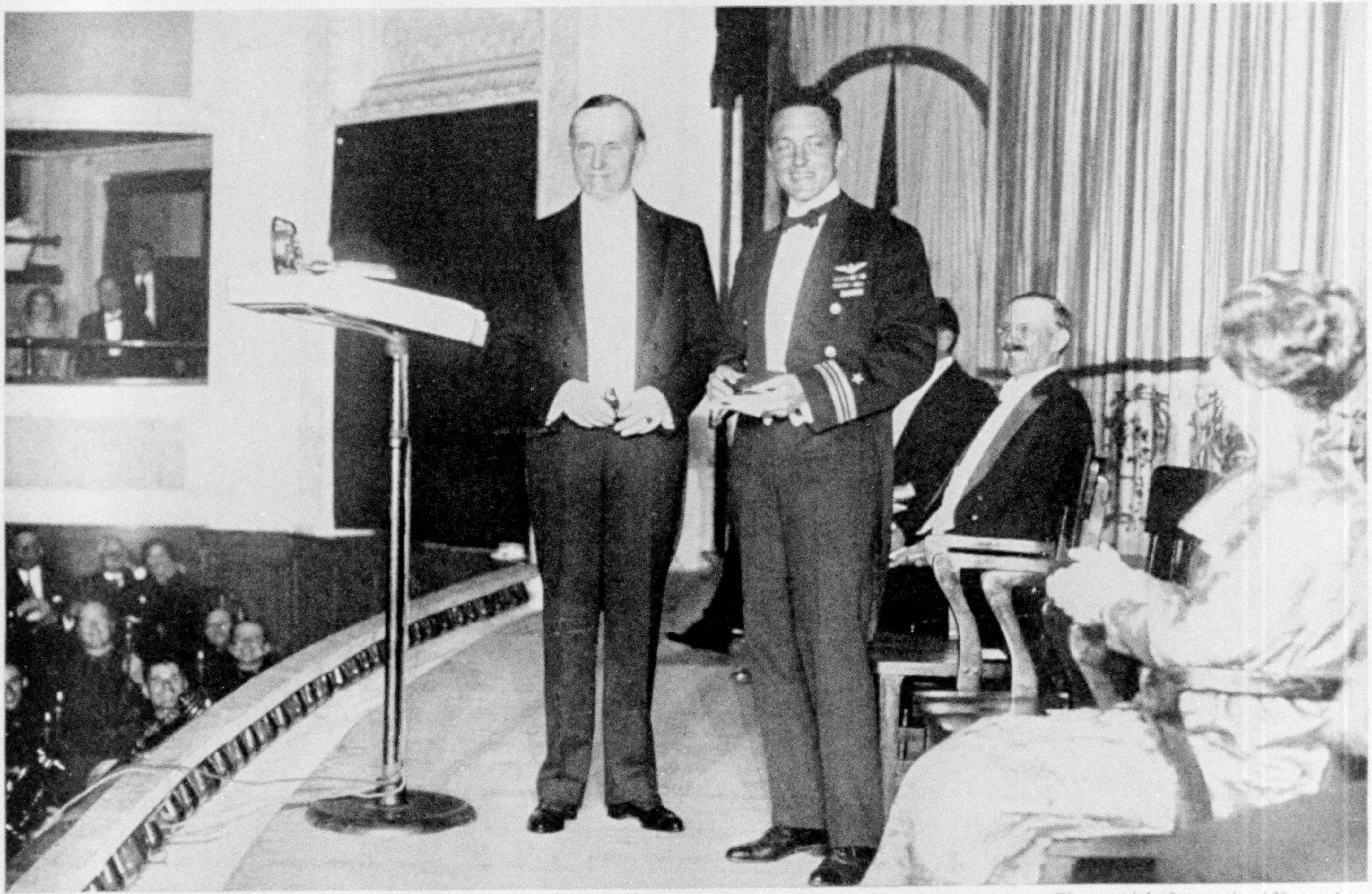
"The Navy and The Society worked together in the closest harmony and cooperation and with that dignity with which the Geographic Society shares with the governmental departments.



Official Photograph U. S. Navy

COMMANDER BYRD USING HIS BUBBLE SEXTANT

The two instruments upon which Commander Byrd placed chief reliance in determining his position on his flight to the Pole were the bubble sextant, which he invented, and the sun-compass (see illustration on opposite page). At the beginning of the return flight the bubble sextant fell from the chart board of the airplane and was broken; thereafter the explorer was forced to rely solely upon the sun-compass.



Photograph by International Newsreel

PRESIDENT COOLIDGE PRESENTS COMMANDER RICHARD EVELYN BYRD, JR., WITH THE HUBBARD GOLD MEDAL

Upon the occasion of the award of this medal to the first man to reach the North Pole by aërial navigation, an audience of 6,000 members and friends of the National Geographic Society, including Justices of the Supreme Court, members of the Cabinet, representatives of the Diplomatic Corps, Senators and Representatives in Congress, and high officials of the Army and Navy, assembled to pay tribute to the explorer. Seated at the extreme right is Mrs. Coolidge, and to the right and rear of Commander Byrd is Dr. Gilbert Grosvenor, President of The Society. Secretary Wilbur and Assistant Secretary Robinson were also on the platform.

"And so started in this country exploration of the Arctic by airplanes, and it seemed for me most fitting that the pioneers should be the Navy and the Geographic Society, both so prominent in Arctic history.

EXPERIENCE GAINED ON SOCIETY'S EXPEDITION

"Our three Loening amphibian planes flew 6,000 miles up there, and the flyers saw 30,000 square miles of Arctic regions; and, by the way, those same planes are now being used by the Navy in the Tropics. One of the inevitable results of the expedition was that much was learned about Arctic flying.

"It seems an interesting bit of fate that the three men most responsible for those flights—the President, Secretary Wilbur, and Dr. Grosvenor—have joined here in welcoming us to-night.

"It gives me the opportunity I have wanted to acknowledge the great debt this Expedition owes them. The Byrd Arctic Expedition was a direct result of last year's expedition, and our success this year was made possible only by what we learned last year about Arctic flying conditions and polar navigating, where the compass does queer things.

"Our relationship with Dr. Grosvenor and his staff, during the expedition last year and subsequently, was a joy to us. I have never known an organization so coöperative and courteous throughout.

"Before our start this spring, Dr. Grosvenor presented me with the sun-compass invented by one of his staff, Albert H. Bumstead. I already had one that had been presented by the National Geographic Society the previous year, and I do not hesitate to say that without these compasses it would have been impossible for us to have steered a straight course to the Pole.

"This compass will prove to be a distinct contribution to science. All explorers will carry it, as well as seagoing ships.

"And so there are many excellent reasons why I am particularly happy to be welcomed and honored by the National Geographic Society, which has been so big a factor in our success.

"Now, a word as to why no effort was made to go to the Arctic officially, under official orders.

"I quote from the first paragraph of an article I wrote for the NATIONAL GEOGRAPHIC MAGAZINE last year: 'Aviation will conquer the Arctic, and the Antarctic, too; but it will be difficult and hazardous.'*

"My flying mate, Floyd Bennett, and I came to this conclusion as a result of the 3,000 miles we flew last year in Naval Arctic Plane Number One. Yet we felt that, in spite of the difficulties, an airplane could be flown in the Arctic either in the spring or summer, but that different types of planes would be advisable.

"We began planning for this year's effort immediately after we left our base at Etah last summer, and concluded that, because of the uncertainties involved, it would be anything but patriotic even to request the Navy or the Geographic Society to take the responsibility for the next Arctic attempt. You see, we knew we were still pioneering in Arctic flying.

THE PERSONNEL OF THE EXPEDITION

"But we did ask and receive from the Navy moral support. Rear Admirals Moffett and Shoemaker, Admiral Eberle, and Secretary Wilbur approved three months' leave for Machinist Mate Peterson and Aviation Pilot Floyd Bennett and indefinite leave for me.

"And General Lejeune approved leave for McKay and Kessler, of the Marine Corps, and released Lieutenant Parker, Marine Corps Reserve, from active duty, so that he could accompany the Expedition.

"So there were five regulars with the Expedition and 50 per cent of the rest of the personnel were ex or reserve Navy and Marine Corps men from all walks of life.

"Two reserve Army officers who had been wounded during the World War went as ordinary seamen, and they made good ones, too. The ship's officers were largely from the Merchant Marine, while the U. S. Weather Bureau detailed W. C. Haines as the Expedition meteorologist.

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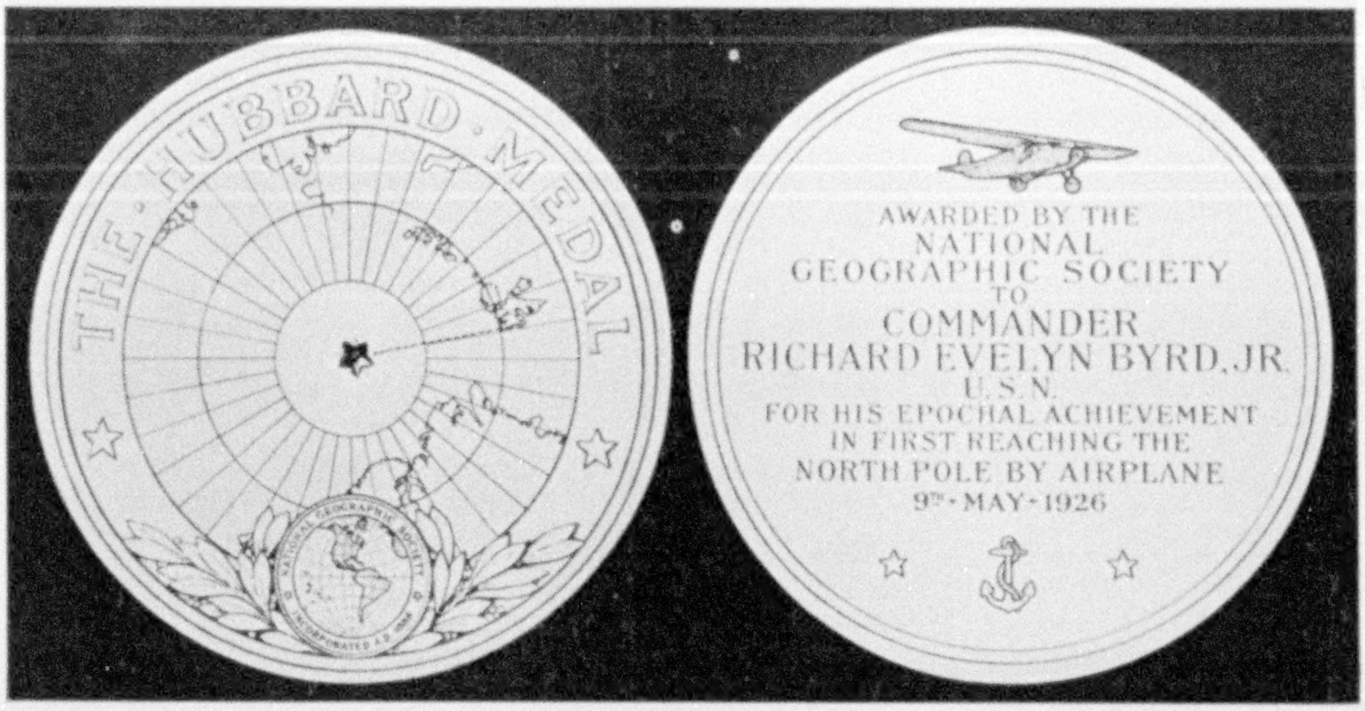
* See "Flying Over the Arctic," by Lieut. Commander Richard E. Byrd, Jr., in the NATIONAL GEOGRAPHIC MAGAZINE for November, 1925.



Medal by Tiffany

THE HUBBARD GOLD MEDAL PRESENTED TO COMMANDER BYRD

In the center (Pole) of the obverse side of the medal is an American sapphire. Only six other individuals have ever received this coveted trophy from the National Geographic Society.

"The U. S. Shipping Board lent us one of its laid-up fleet ships, the *Chantier*, 3,500 tons, for a dollar a year plus $3,800 insurance, and did all in its power to cooperate with us. That ship ran 10,000 miles without a breakdown and without recoaling.

"The Expedition was financed by Edsel Ford, John D. Rockefeller, Jr., Vincent Astor, Rodman Wanamaker, Dwight Morrow, Thomas F. Ryan, Captain and Mrs. John Gibbons, Representative Louis A. Frothingham, and others.

"On account of the statements of two famous explorers, that airplanes were useless in the Arctic, and the admitted unknown quantities ahead, I still felt that it was fairer to divide the responsibilities and subscriptions, and so I asked only for limited amounts.

"Patriotic business concerns all over the country gave material at cost and some things were donated.

"I have mentioned the organizations and individuals who have assisted our Expedition, for I am being honored for a success their help made possible.

PEARY FORESAW THE FUTURE OF AIRCRAFT IN THE ARCTIC

"Admiral Peary was the first man to reach the Pole by dog sledge, and I believe he will be the last, for it is my opinion that in Arctic and Antarctic exploration, too, the dog sledge must give way to aircraft; the old school has passed.

"Admiral Peary himself said in his last public address, just prior to his death, which, by the way, was delivered before the National Geographic Society: 'Coming polar explorers, both north and south, are quite likely to use mechanical means which have sprung into existence within the last few years. According to my own personal impressions—aërial flights.'

"How true his prophecy has turned out to be! *

"We know more about landing in the Arctic now, and more detailed exploration can be done in the future. Exploration by aircraft had to be developed gradually, and too many details could not be expected during the pioneering period.

FORESEES AMERICANS AT THE SOUTH POLE

"America will not rest content until the three million square miles of unexplored regions in the Arctic and Antarctic have been taken by aircraft from the column of the Unknown, and in so doing much valuable scientific data will be given to the world.

"And the United States must plant its

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* See "The National Geographic Society's Notable Year," in the NATIONAL GEOGRAPHIC MAGAZINE for April, 1920.

flag at the South Pole. It has never been there or anywhere near it.

"But this I will say to those who explore by air in the Polar Regions: However conservatively the expedition is planned, in the execution risk must be taken to succeed.

"Captain Scott, of the Royal Navy, wrote as he lay freezing to death on his return trip from the South Pole: 'We took risks, we knew we took them; things have come out against us.' Scott took only necessary chances, but luck was against him. While death stood at his elbow, his last written words were: 'We have been willing to give our lives to this enterprise, which is for the honor of our country.'

"It may be difficult to understand that feeling back here, living in ease and security; but when one looks toward one's country from the hardships of the Frozen North, detached and isolated, a feeling comes akin to that expressed by Scott, and it seems then the most natural thing in the world.

"That accounts for the superhuman work done by those great fellows with me. They made me feel proud to be an American, proud to be one of them, and I receive this medal thinking of them and of my flying mate here, Floyd Bennett, who deserves credit above any one of us.

"As for me, what I have been capable of I owe to the Navy. All my training has come from her.

DID NOT GO FOR REWARD

"We did not go up there for reward. We expected none except that satisfaction that perhaps our efforts might make some contribution to Progress.

"We have hoped, too, that our flight might help to give business that confidence in airplanes that it needs to launch out into a great era of commercial development of aviation—that wonderful science that took us so easily over the frozen wastes to the top of the world!

"Within thirty years commercial aviation will so spread that regular flights will be made over the Polar Regions from country to country, cutting off thousands of miles, and so bringing the nations of the world closer together, both in distance and in spirit."

Dr. Grosvenor in presenting the next speaker said:

"The National Geographic Society extends heartiest congratulations also to the distinguished head of the Department of the Navy, who will now favor The Society with an address.

"The Honorable Curtis D. Wilbur."

THE SECRETARY OF THE NAVY SPEAKS FOR THE SERVICE

Secretary Wilbur spoke as follows:

"It would be difficult, if not impossible, for me to avoid the personal and the individual elements in this adventure, and I shall not endeavor to do so. When Lieutenant Commander Byrd asked for my permission to undertake this flight, before consenting I asked, 'Are you married?' 'Yes,' he said. 'Has your wife consented to your expedition?' 'Yes,' he replied; 'she said that she was willing that I should do whatever I considered my duty.' 'Have you any children?' 'Yes; three.' 'As your wife is willing, I will give you leave.'

"I am sure that we will not do justice to ourselves or to our inmost convictions if we fail to do honor on this occasion to the heroic little woman who had so little to gain and so much to lose in this undertaking. She is present and I will ask her to stand up, so that you can see her. . . . So many women are standing that I fear we will have to postpone our effort to identify Mrs. Byrd." (Laughter.)

"We are met here to honor a fellow citizen who has added by his efforts to the sum of human knowledge. The President of the United States has appropriately expressed this commendation of the whole people of the United States, but my task in speaking for the Navy Department, to which Lieutenant Commander Byrd belonged, is somewhat different and more personal.

"I speak for 'the Service,' which includes every officer and every man in the Navy and their wives and families. Whether or not it includes the Secretary, I am not sure, but at least he is the spokesman for that invisible entity called 'the Service.'

"There are many naval officers here. Some of them have helped to develop the engines used by Lieutenant Commander

Byrd and feel a peculiar pride and satisfaction that the ceaseless pulsations of these engines for fifteen and one-half hours carried their fellow officer safely to and from the Pole.

"But we are not here to glorify machines or those who design or fabricate them, but to do honor to the courage and skill of the first men to reach the Pole by airplane. No others can ever be first, no matter how long time endures.

"THE MOST DIFFICULT POINT ON THE SURFACE OF THE EARTH"

"We are proud of Lieutenant Commander Byrd because of his great achievement. Our hearts are lifted up because his success is our success, and we join with him in the pride of accomplishment. We are proud that on his own initiative, and with funds and means collected by his own enthusiasm, he has organized the expedition, secured a ship, collected and organized her crew, secured an airplane and necessary accessories, and returned victorious over all obstacles, with complete records and with motion pictures of the Pole.

"One of the outstanding achievements of the Polar flight was the successful navigation of the plane to and from the Pole. Many of the familiar aids to navigation could not be used. The Pole itself is one of the most interesting and, from the navigational standpoint, the most difficult point on the surface of the earth.

"At the Pole there is no north, no east, and no west. The north end of the magnetic needle points south; the gyroscopic compass would point straight down; the Pole Star is directly overhead; the stars are invisible because of the sun; there is no sunrise and no sunset; the sun is constantly on the meridian; it is always noon there when it is not night; there are no charts and no landmarks; no opportunity to take soundings.

"In this strange region, with its navigational contradictions and peculiarities, the recently invented sun-compass comes to the aid of the navigator, and he is thus able to steer by a shadow cast along the moving hour-hand of a twenty-four hour clock face. The revolution of the hour-hand compensates for the revolution of the earth, and thus in effect causes the sun to stand still, so that the navigator can steer with reference to it. But even this aid would fail in event of long-continued cloudiness or fog.

"While Lieutenant Commander Byrd escaped the perils due to rough and treacherous ice and the long months of wearisome work involved in plodding over the ice fields as Peary did, he risked his life and his success largely upon the chance that the sun would be visible a large part of the day of his flight.

"The fact that this flight was successfully made demonstrates the carefulness of the preparation for the flight and indicates the skill and good judgment of Lieutenant Commander Byrd. His choice of the time of flight and his decision to complete it without landing involved determination of the highest order, and the event proves that his judgment was as sound as his courage and determination were great."

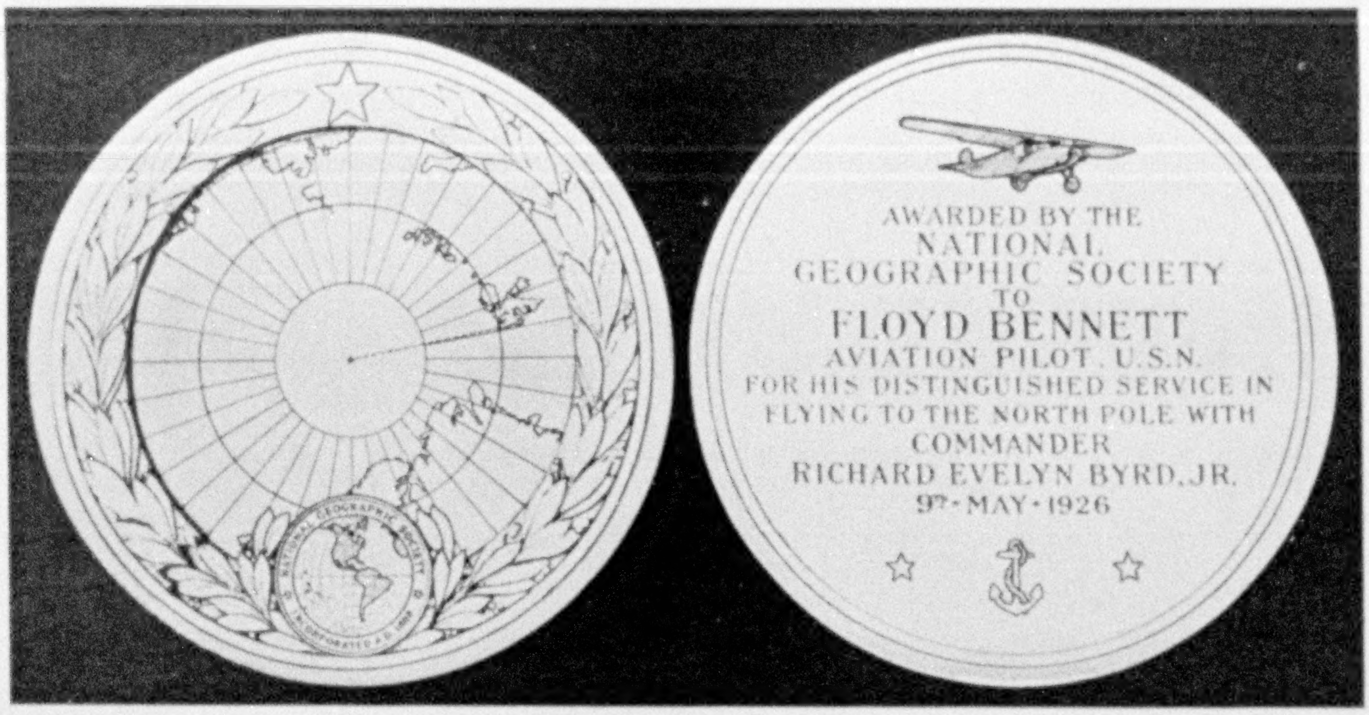
EXPLORER SUBMITS HIS RECORDS TO THE SOCIETY

Prior to his return to Washington, Commander Byrd submitted his records, through the Secretary of the Navy, to the National Geographic Society. The papers were referred to a special committee of The Society, consisting of its President, Dr. Gilbert Grosvenor; the Chairman of its Research Committee, Dr. Frederick V. Coville, and Col. E. Lester Jones, a member of the Board of Trustees, who is also the Director of the United States Coast and Geodetic Survey.

This committee, appointed by The Society's Board of Trustees, at the conclusion of its investigation and computations reported its findings to the Secretary of the Navy, as follows:

"The committee has examined the original records of Commander Byrd and found them to have been carefully and accurately kept. In the opinion of the committee, these records substantiate in every particular the claim of Commander Byrd that on May 9, 1926, he reached the North Pole by airplane, thus being the first person to reach the North Pole by aërial navigation.

"The committee has had expert assistance in the examination of the records from Mr. Hugh C. Mitchell, Mathemati-



Medal by Tiffany

THE MEDAL PRESENTED TO AVIATION PILOT FLOYD BENNETT

Upon the same occasion that President Coolidge presented the Hubbard Medal to Commander Byrd he presented a gold medal, also awarded by the National Geographic Society, to the leader's companion in the flight (see text, page 378).

cian of the U. S. Coast and Geodetic Survey; Mr. Henry G. Avers, Chief Mathematician of Geodesy of the Coast and Geodetic Survey, and Mr. Albert H. Bumstead, Chief Cartographer of the National Geographic Society. These experienced calculators have verified all of Commander Byrd's computations, devoting five consecutive days to the work; they have also critically examined the sextant used by Commander Byrd. The results of their examination are attached to this report."

EXPERTS FIND ALL BYRD'S RECORDS KEPT ON TWO CHARTS

"Dr. Gilbert Grosvenor,
"Dr. Frederick V. Coville,
"Colonel E. Lester Jones,
"National Geographic Society,
Washington, D. C.

"Dear Sirs:

"We have the honor of submitting the following report of our examination of Lieutenant Commander Richard Evelyn Byrd's 'Navigation Report of Flight to Pole.' We have carefully examined Commander Byrd's original records of his observations en route to and from the North Pole. These records are contained on two charts on which Commander Byrd wrote his observations, made his calculations, and plotted his positions. We have verified all his computations. We have also made a satisfactory examination of the sextant and sun-compass used by Commander Byrd.

POSITION OF PLANE GIVEN AT HOURLY INTERVALS

"The plane left Kings Bay, Spitsbergen, at 00 hour 37 minutes, Greenwich civil time, May 9, 1926; passed the north end of Amsterdam Island at 1 hour 22 minutes G. C. T., headed north, following closely the 11° 04′ meridian of east longitude.

"The dead-reckoning position of the plane is given for hourly intervals after leaving Amsterdam Island, and also at the times sextant observations were made. Ten sextant observations to determine the altitude of the sun were made, six at various intervals between Amsterdam Island and the Pole and four while the plane was flying at the Pole. The accompanying chart (see page 386) shows the route and the positions when observations were taken.

"Under the conditions of flying, it is manifestly impossible to make more than one astronomical observation from any one point. A single astronomical obser-

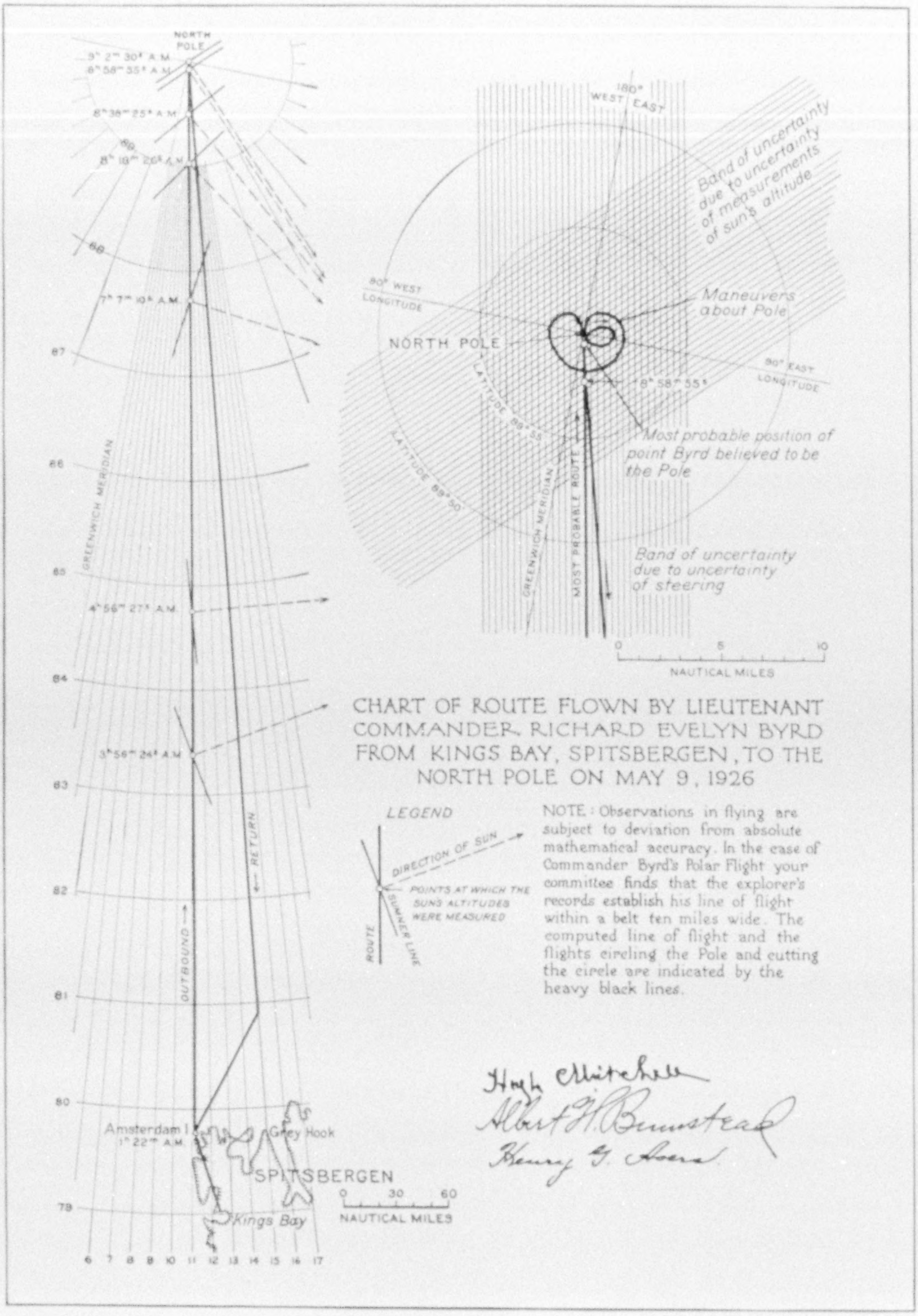

NORTH POLE
$9^h\ 2^m\ 30^s$ A.M.
$8^h\ 58^m\ 55^s$ A.M.
$8^h\ 38^m\ 25^s$ A.M.
89
$8^h\ 18^m\ 26^s$ A.M.
88
$7^h\ 7^m\ 10^s$ A.M.
87
86
GREENWICH MERIDIAN
85
$4^h\ 56^m\ 27^s$ A.M.
84
$3^h\ 56^m\ 24^s$ A.M.
83
RETURN
82
OUTBOUND
81
80
Amsterdam I.
$1^h\ 22^m$ A.M.
Grey Hook
SPITSBERGEN
79
Kings Bay
6 7 8 9 10 11 12 13 14 15 16 17
0 30 60
NAUTICAL MILES
180°
WEST EAST
Band of uncertainty due to uncertainty of measurements of sun's altitude
80° WEST LONGITUDE
Maneuvers about Pole
NORTH POLE
90° EAST LONGITUDE
LATITUDE 89°55'
$8^h\ 58^m\ 55^s$
LATITUDE 89°50'
Most probable position of point Byrd believed to be the Pole
GREENWICH MERIDIAN
MOST PROBABLE ROUTE
Band of uncertainty due to uncertainty of steering
0 5 10
NAUTICAL MILES
LEGEND
DIRECTION OF SUN
POINTS AT WHICH THE SUNS ALTITUDES WERE MEASURED
ROUTE
SUMNER LINE

CHART OF ROUTE FLOWN BY LIEUTENANT COMMANDER RICHARD EVELYN BYRD FROM KINGS BAY, SPITSBERGEN, TO THE NORTH POLE ON MAY 9, 1926

NOTE: Observations in flying are subject to deviation from absolute mathematical accuracy. In the case of Commander Byrd's Polar Flight your committee finds that the explorer's records establish his line of flight within a belt ten miles wide. The computed line of flight and the flights circling the Pole and cutting the circle are indicated by the heavy black lines.

Hugh Mitchell
Albert H. Bumstead
Henry G. Avers

PHOTOGRAPH OF THE CHART DEVISED BY THE COMMITTEE OF MATHEMATICAL EXPERTS FOR CHECKING COMMANDER BYRD'S POLAR FLIGHT DATA

"At very close to 9 hours 3 minutes, Greenwich civil time, May 9, 1926, Lieutenant Commander Richard Evelyn Byrd was at the North Pole" (see text, page 388).

vation does not give a location, but only a line passing through the position of the observer. Such lines are called 'Sumner lines.' If the latitude or longitude of the point of observation is known or its direction or distance from some known point, the position of a Sumner line may be determined.

"In the present case we have both the direction and the estimated distance from Amsterdam Island to give the position on the Sumner lines resulting from the sextant observations of the altitude of the sun.

DIRECTION OF FLIGHT KNOWN WITH GREAT PRECISION

"The resulting positions obtained by using the direction may differ from those obtained by using the estimated distance. This is to be expected. The distances depend upon estimates of speed, and estimates of speed depend upon the altitude of the plane obtained with an aneroid barometer.

"The barometer readings of altitude depend on the assumption that the sea-level atmospheric pressure remains constant over the whole route of the flight, something which in ordinary latitudes rarely happens between points so widely separated. We do not know if these conditions are better in the Polar Regions. It is our belief, therefore, that estimates of speed may be subject to large errors.

"But the direction of flight from Amsterdam Island could be known with a comparatively high degree of precision, as it depended only on the skillful use of two optical instruments, the drift indicator and the sun-compass, both capable of giving the direction within one degree. When these instruments were used almost continuously, as they were, it seems probable that the route flown followed closely the route planned, the deviations to the right tending to balance the deviations to the left.

"Attention is called to the fact that the Sumner line determined at 4 hours 56 minutes, coinciding so nearly in direction with the direction of flight, gives a splendid determination of longitude and check on his steering at a point about midway of the flight, just as the one determined at the Pole and intersecting the course at an angle of about 56 degrees gives a good condition for the determination of latitude.

"The amount which the plane may be actually off the Sumner line is not affected by inaccuracies of steering, such as enter into the holding the compass course, or determining and correcting for drift, but are wholly due to errors in the observed elevation of the sun. These elevations were determined with a sextant, in which the bubble supplies the horizon of reference, an instrument developed by Commander Byrd and in the use of which he was most skillful.

"An estimate of the error attending such an observation may be obtained by fitting the dead reckoning to the Sumner lines and by a consideration of the capacity of the sextant. From this evidence, it is believed that five miles, plus or minus, represents a reasonable estimate of the limits of this error, which is not accumulative, but is the same for all Sumner lines thus determined.

"It may be noted, also, that in comparing positions determined at 8 hours 18 minutes, 8 hours 38 minutes, and 8 hours 59 minutes, it becomes necessary to assume errors of only two minutes in the observed altitudes to bring them into full accord with the average speed between the determined positions. This would indicate that 5 minutes is a very reasonable limit to assign to the uncertainty of an observed altitude.

ARRIVAL AT POLE THREE MINUTES PAST NINE IN THE MORNING

"At 8 hours 58 minutes 55 seconds an observation of the altitude of the sun gave a latitude of 89° 55.3′ on the meridian of flight. This point is 4.7 miles from the Pole. Continuing his flight on the same course and at the speed of 74 miles per hour, which he had averaged since 8 hours 18 minutes, would bring Commander Byrd close to the Pole in 3 minutes 49 seconds, making the probable time of his arrival at the Pole 9 hours 3 minutes, Greenwich civil time.

"At the time Commander Byrd was close to the Pole he estimated the moment of his arrival there at 9 hours 2 minutes. Our calculations differ from his estimate less than one minute, during which time he would have flown about one mile.

From this it appears that he chose the right place to maneuver.

"Flying his plane to the right long enough to take two sextant observations, he turned around and took two more observations. These four observations confirmed his dead-reckoning position of the Pole. He then attempted to fly his plane in a circle several miles in diameter, with his Pole position as a center.

EXPLORER'S FIELD OF VIEW OVER POLE A CIRCLE 120 MILES IN DIAMETER

"Flying at and about the Pole at an altitude of 3,000 feet, Commander Byrd's field of view was a circle more than 120 miles in diameter. The exact point of the North Pole was close to the center of this circle, and in his near foreground and during more than two hours of his flight was within his ken.

"Soon after leaving the Pole, the sextant which Commander Byrd was using slid off the chart table, breaking the horizon glass. This made it necessary to navigate the return trip wholly by dead reckoning.

"In accomplishing this, two incidents should be specially noted. At the moment when the sun would be crossing the 15th meridian, along which he had laid his course, he had the plane steadied, pointing directly toward the sun, and observed at the same instant that the shadow on the sun-compass was down the middle of the hand, thus verifying his position as being on that meridian. This had an even more satisfactory verification when, at about 14 hours 30 minutes, G. C. T., he sighted land dead ahead and soon identified Grey Point (Grey Hook), Spitsbergen, just west of the 15th meridian.

"It is unfortunate that no sextant observations could be made on the return trip; but the successful landfall at Grey Hook demonstrates Commander Byrd's skill in navigating along a predetermined course, and in our opinion is one of the strongest evidences that he was equally successful in his flight northward.

"The feat of flying a plane 600 miles from land and returning directly to the point aimed for is a remarkable exhibition of skillful navigation and shows beyond a reasonable doubt that he knew where he was at all times during the flight.

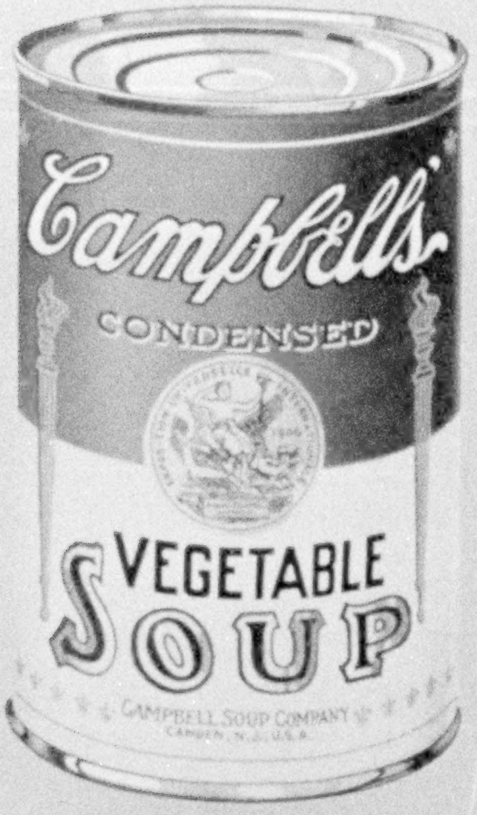
"It is the opinion of your committee that at very close to 9 hours 3 minutes, Greenwich civil time, May 9, 1926, Lieutenant Commander Richard Evelyn Byrd was at the North Pole, in so far as an observer in an airplane, using the most accurate instruments and methods available for determining his position, could ascertain.

"Respectfully submitted,
"HUGH C. MITCHELL.
"ALBERT H. BUMSTEAD.
"HENRY G. AVERS."

COPIES OF DATA FILED WITH OTHER SOCIETIES

After the Secretary of the Navy had received the Report of the Special Committee of the National Geographic Society, corroborating in every particular Commander Byrd's data which established his right to the distinction of being the first man to reach the North Pole by aërial navigation, the explorer transmitted certified copies of his data and photographic reproductions of his charts, together with true copies of the Report of the Special Committee, to a number of the leading geographical societies of the world for their archives.

❦



There's a meal in this Vegetable Soup!

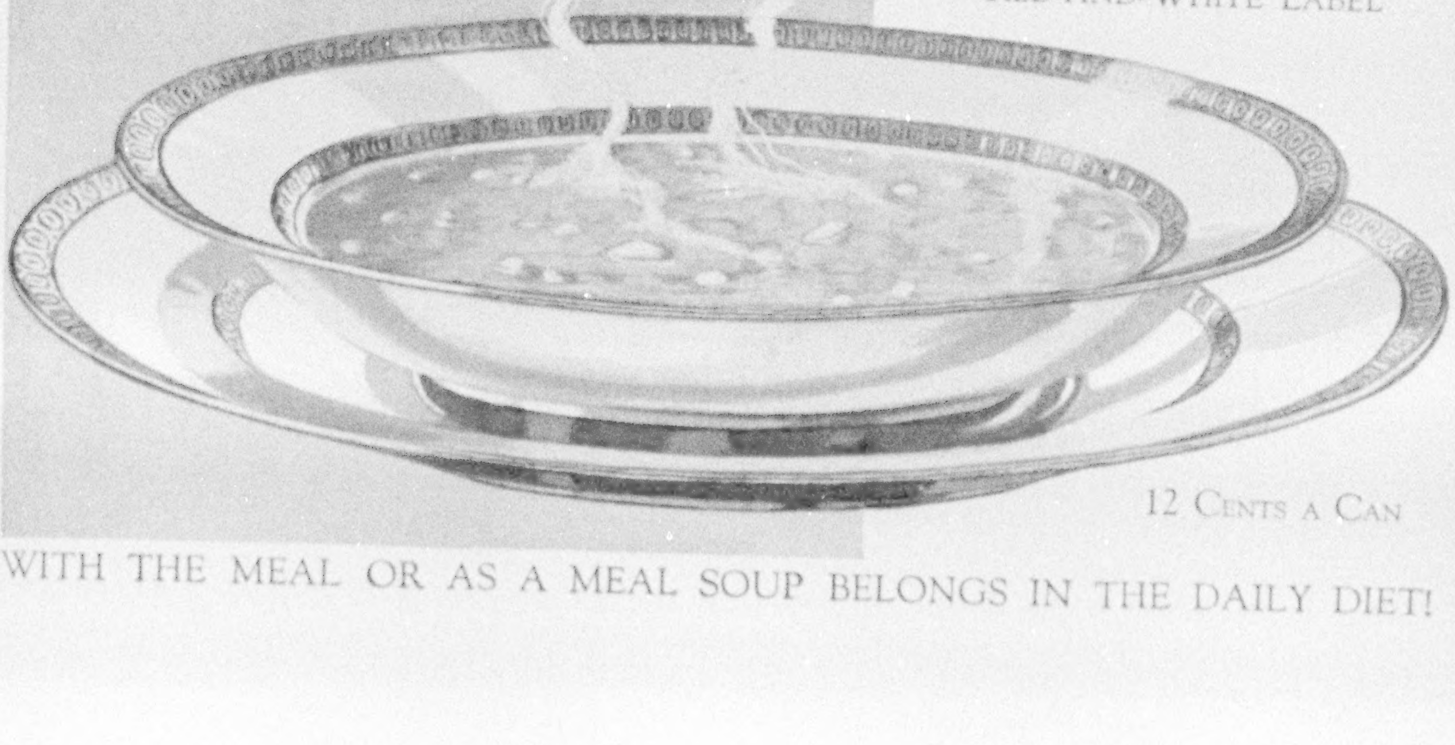
SOUP

for your family's health

EVERY housewife knows that if the family appetites are good, her meals will be enjoyed. She realizes that more than half her daily battle is won if those who assemble at her dining table are attracted *at once* by the food and start the meal eagerly. To win this victory, good hot, appetizing *soup* is most helpful. Soup is invaluable as a wholesome, healthful stimulant to the appetite. The blended flavors of many different ingredients in soup appeal instantly to the sense of taste, arouse it, make it vigorous and keen.

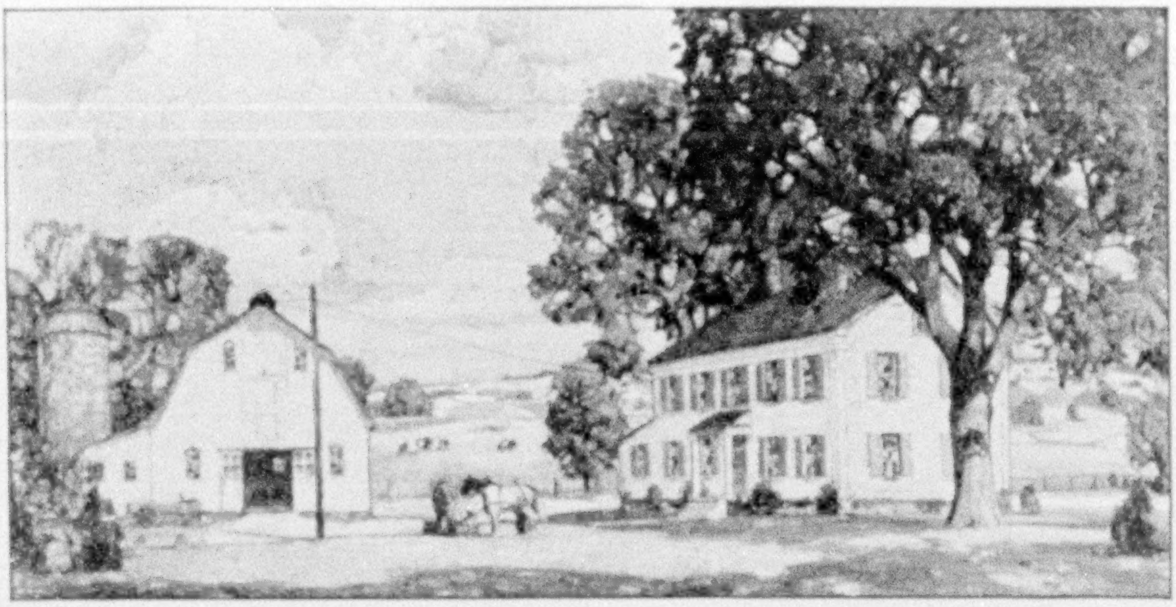
APART from the splendidly nourishing value of soup, which it shares with other foods, it helps to keep the appetite active and healthy. In doing this it also has a beneficial effect on the digestion. Soup causes the digestive fluids to flow more freely. The result is that food is eaten in greater quantity and assimilated into the body tissue more promptly.

LOOK FOR THE
RED-AND-WHITE LABEL



12 CENTS A CAN

WITH THE MEAL OR AS A MEAL SOUP BELONGS IN THE DAILY DIET!



The Telephone and the Farm

THERE was not a farmer in the world fifty years ago who could talk even to his nearest neighbor by telephone. Not one who could telephone to the doctor in case of sickness or accident. Not one who could telephone for the weather report or call the city for the latest quotations on his crops. Not one who could sell what he raised or buy what he needed by telephone. A neighborly chat over the wire was an impossibility for the farmer's wife or children.

In this country the telephone has transformed the life of the farm.

It has banished the loneliness which in the past so discouraged the rural population and drove many from the large and solitary areas of farms and ranches.

It is a farm hand who stays on the job and is ready to work twenty-four hours every day.

The telephone has become the farmer's watchman in times of emergency.

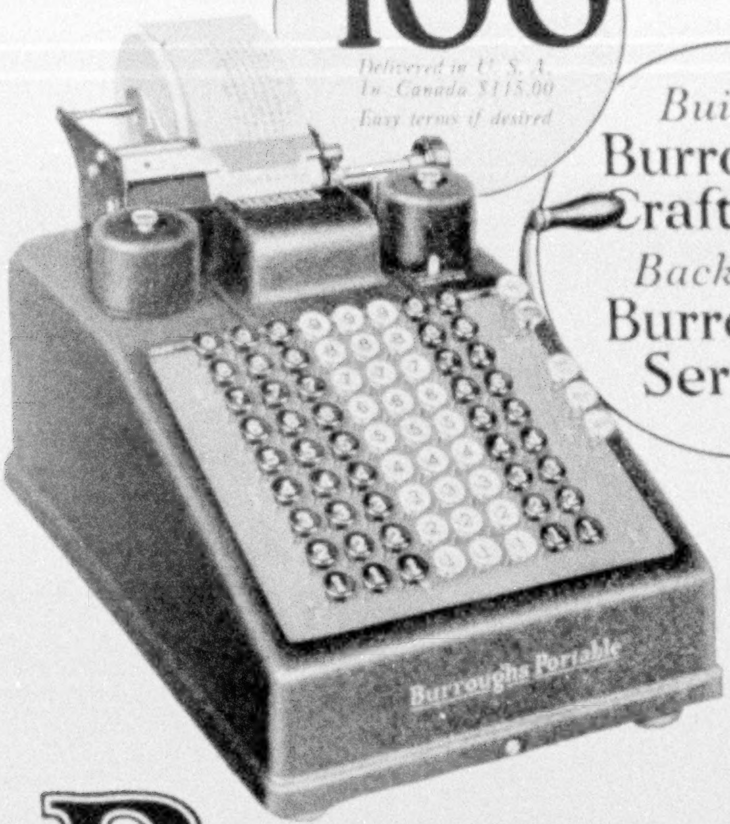
It outruns the fastest forest or prairie fires and warns of their approach. It has saved rural communities from untold loss of lives and property by giving ample notice of devastating floods. Three million telephones are now in service on the farms, ranches and plantations of the United States.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

BELL SYSTEM

IN ITS SEMI-CENTENNIAL YEAR THE BELL SYSTEM LOOKS FORWARD
TO CONTINUED PROGRESS IN TELEPHONE COMMUNICATION

ADDING · BOO LCULATING AND BILLING MACHINES



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Delivered in U. S. A.
In Canada $115.00
Easy terms if desired

Built by
Burroughs
Craftsmen
Backed by
Burroughs
Service

The Public Was Waiting for

Burroughs

Portable Adding Machine

The public was waiting for just such an adding machine—lightweight, sturdy, dependable—yet low-priced.

30,000 are already in use—convincing proof that an urgent need for this type of machine existed among manufacturers, wholesalers, retailers, professional men, secretaries of organizations, and even housewives.

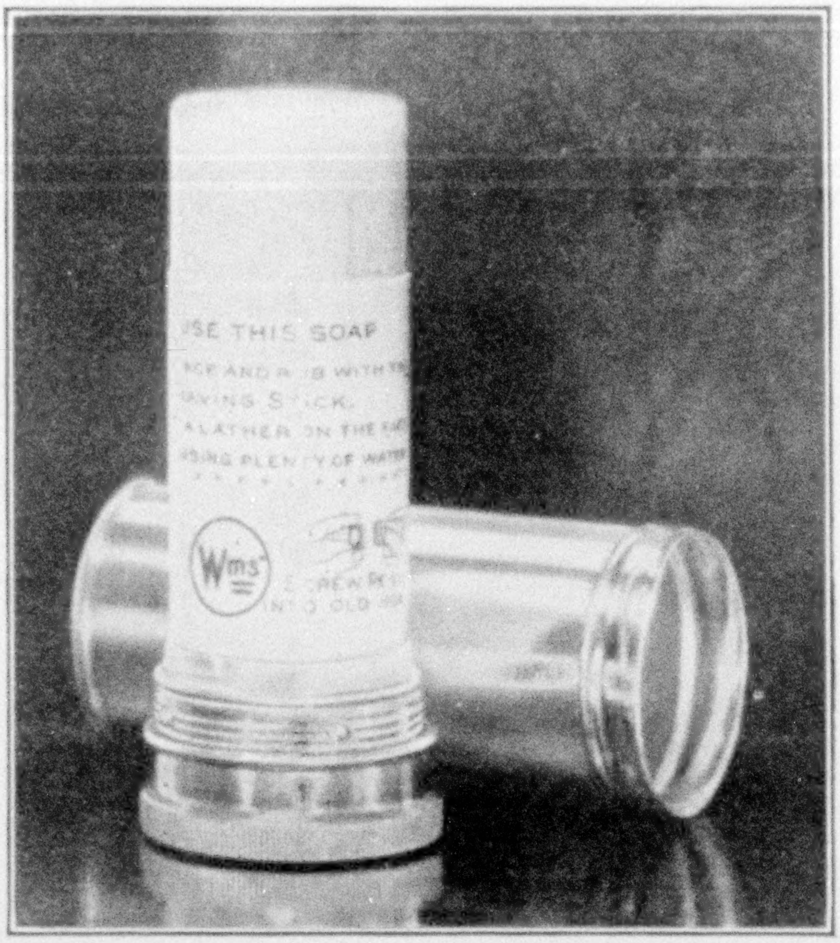
This machine adds up to $1,000,000.00; has standard visible keyboard, and one-hand control. It can easily be carried wherever required. It is built with the same quality and precision and backed by the same guarantee and service that have maintained Burroughs leadership for over forty years.

The price is only $100—$10 down, with the balance in easy payments.

Write or call the local Burroughs office today for a free demonstration on your own work. There is no obligation.

BURROUGHS ADDING MACHINE COMPANY
6552 SECOND BLVD., DETROIT, MICHIGAN
Burroughs Adding Machine of Canada, Limited—*Offices in All the Principal Cities of the World*

ADDING · BOOKKEEPING · CALCULATING AND BILLING MACHINES



Two things you want . .
this shaving stick has both

WILLIAMS Holder Top Shaving Stick has two distinct features: First, it gives you the famous Williams lather; and, second, a holder in which the soap itself cannot work loose.

Williams lather absorbs an extraordinary amount of moisture. It works up fast, rich and bulky—permeates each bristle of the beard—soaks whiskers so soft that the razor just glides through them. Williams leaves the skin in perfect condition, as if it had been through an expert barber's massage.

The stick can't slip in the Williams Holder Top. A threaded metal ring surrounds the soap itself and screws fast into the metal top. When it's time for a Reload (and these save money!) you take out the old wafer of soap without fuss or muss and place it on top of the fresh reload.

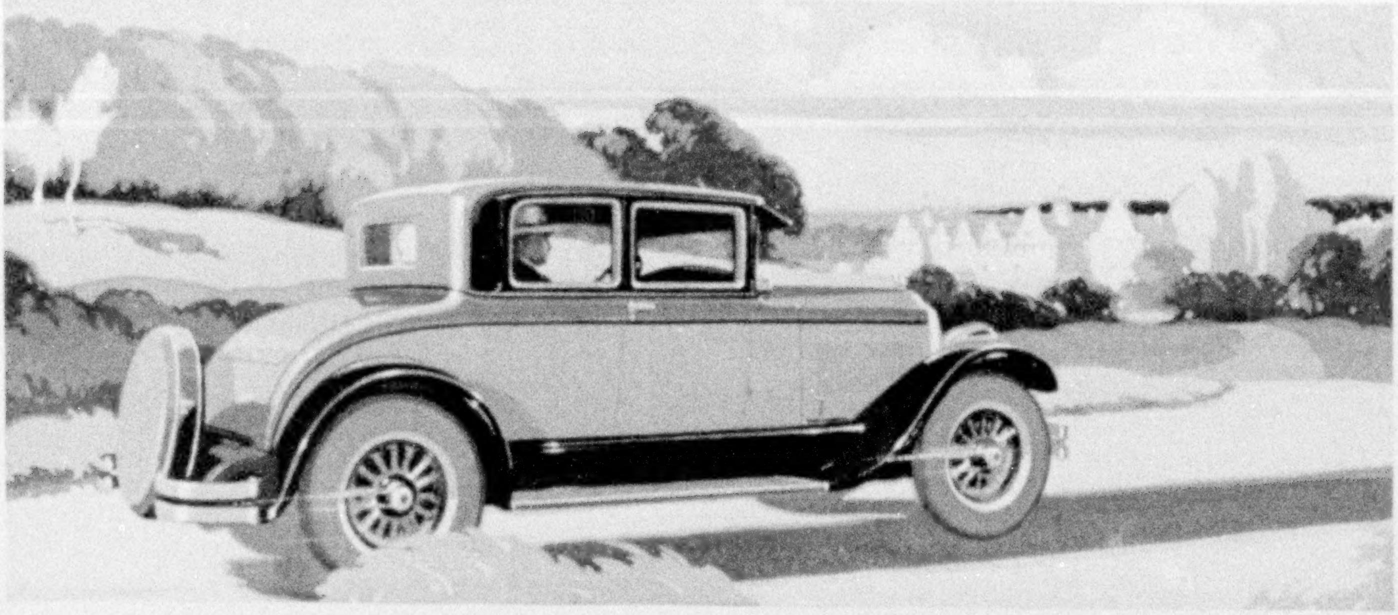
We make Stick, Cream, Powder and Tablet for shaving—four forms—but one lather—Williams.

* * *

AQUA VELVA is our newest triumph—a scientific after shaving preparation. A few drops keep the skin like velvet all day. We will send a generous test bottle free.

The J. B. Williams Co., Dept. 59, Glastonbury, Conn. Canadian Address: 1114 St. Patrick St., Montreal.

Williams
Holder Top Shaving Stick



The Final Perfection of Riding Easement

In the Imperial "80" Chrysler engineers have given owners something more than ordinary roadability. They sought for easement of all riding disturbances under all conditions and speeds and over the most difficult roadways.

This they accomplished by revolutionary principals of shock absorption—special Chrysler-designed spring mounting—long, almost flat springs parallel to the wheels to prevent sidesway—spring ends anchored in specially molded blocks of live rubber, and these in turn securely held under compression in malleable brackets at the frame ends.

These live rubber blocks effectively insulate these springs from the frame and absorb all road shocks and road sounds. They also eliminate annoying squeaks and rattles and do away with the need of lubrication.

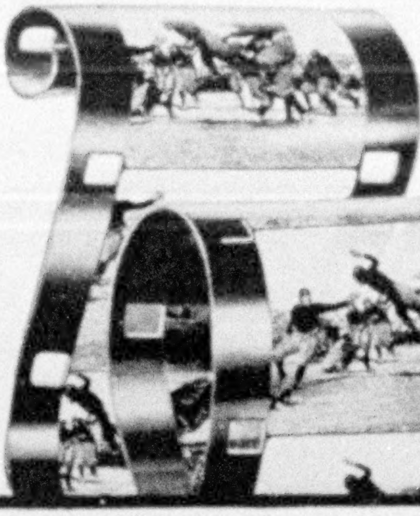
We are eager that you ride in a Chrysler Imperial "80".

Frankly, the results will amaze you. For you will experience a new conception of riding luxury—unsurpassed speed ability even to 80 miles and more an hour *plus* a balanced buoyancy of motion beyond comparison or precedent.

Eight superb body styles at new low prices, $2495 to $3595 f. o. b. Detroit

CHRYSLER SALES CORPORATION, DETROIT, MICHIGAN
CHRYSLER CORPORATION OF CANADA, LIMITED, WINDSOR, ONTARIO

Chrysler Imperial 80



The Magic of Movies the Kodak Way

New Eastman motion picture equipment for the amateur

Ciné-Kodak works at eye level or waist height.

IT'S hard to believe that amateur movies of highest photographic quality are so easy to make—and yet the latest Eastman achievement, Ciné-Kodak, is as easy to use as a Brownie. That's fact. Point the lens, press the release and your movie's in the making.

A new pleasure awaits you—with a new thrill. Even the *excitement* of the game is transmitted to your living room when you show on the screen the action your Ciné-Kodak caught from the stands. That winning putt on the eighteenth hole—a sigh of relief goes up from your fireside audience as the ball goes in. Frolics of the children, incidents of the trip, happenings around the home—whatever it is that pleases you most gives you movies that meet your mood.

Ciné-Kodak loads in daylight with safety film and is spring-motor driven. No tripod. No focusing. The cost of operation is decidedly low—about one-sixth as much as for "standard" movies.

Kodascope C for projecting the picture on the screen rivals Ciné-Kodak in simplicity. Plug in on any electric light circuit, turn on the switch and enjoy the picture.

Ciné-Kodak works at waist height or eye level.

Famous Stars—at your pleasure

Professional photoplays, reasonably rented from Kodascope Libraries, may be included in your program when you like. Douglas Fairbanks, Charlie Chaplin, John Barrymore, Norma Talmadge, Elaine Hammerstein, Irene Rich and the other stars of the Ciné-constellation will entertain in your home whenever you name the night.

The Ciné-Kodak Model B, with Kodak Anastigmat *f*.6.5 lens, is priced at $70; with Kodak Anastigmat *f*.3.5, at an even hundred. The Kodascope C projector is $60.

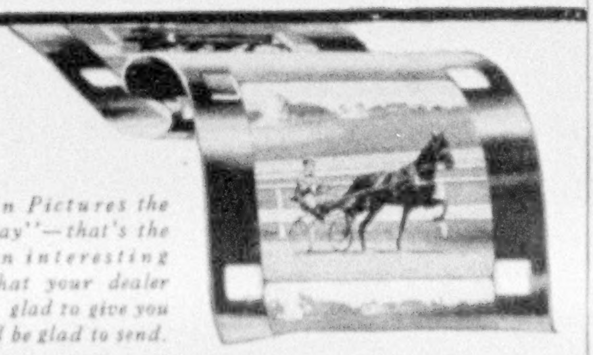
A complete outfit now—Ciné-Kodak, Kodascope and screen—as low as

$140

The thousands of Kodak dealers are now prepared to demonstrate the Ciné-Kodak. If your dealer is not yet ready, write us for Ciné-Kodak booklets.

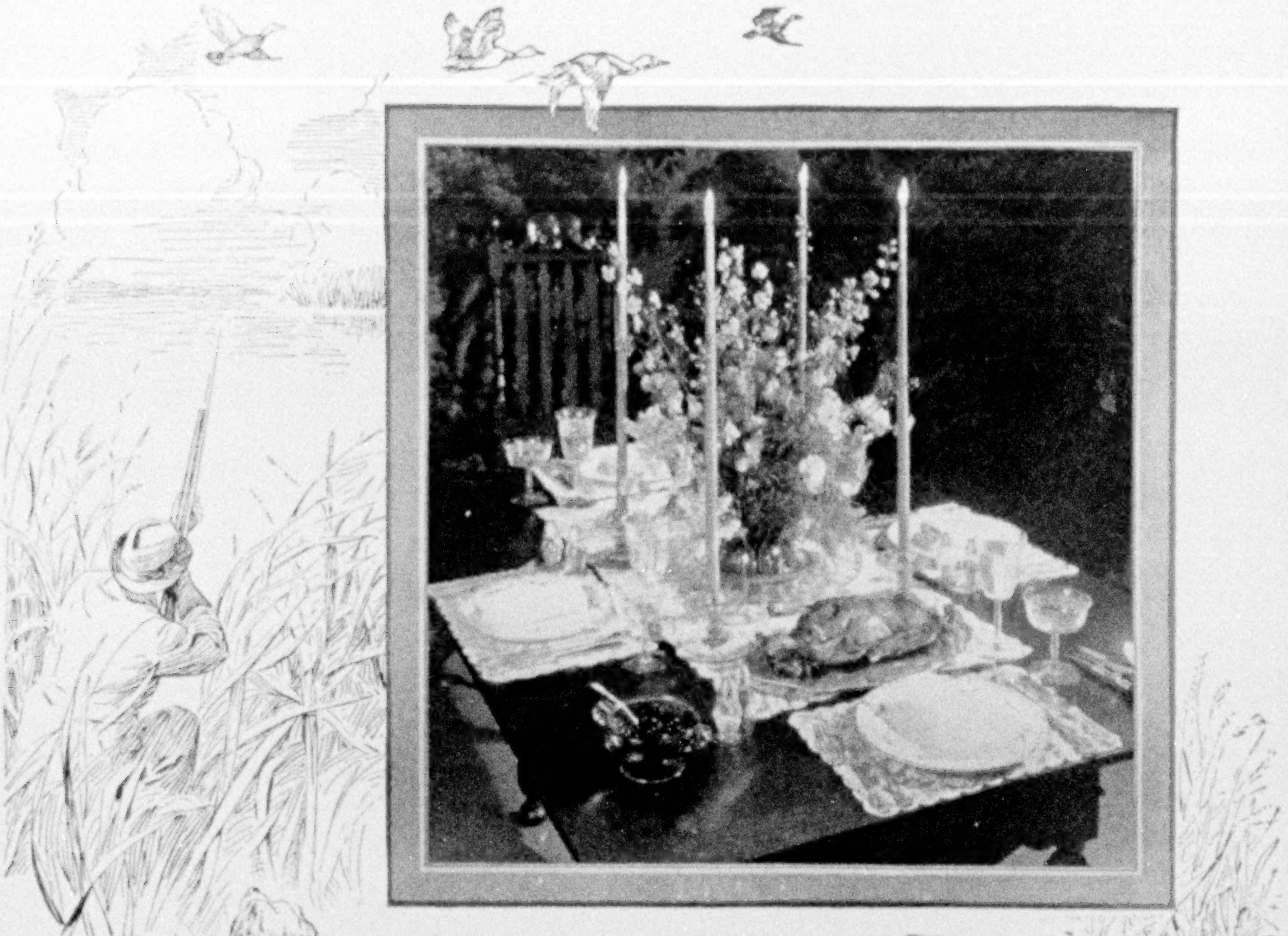
If it isn't an Eastman, it isn't a Ciné-Kodak

Turn on the switch, and the incident happens again on the screen



"Motion Pictures the Kodak Way"—that's the title of an interesting booklet that your dealer would be glad to give you—or we'd be glad to send.

Eastman Kodak Company, Rochester, N. Y., *The Kodak City*



When Duck Days are Here

The hush of dawn—mist floating over the lonely lake—the flight of mallard or canvasback—only dog and gun to share the spirit of the sport.

Then the duck dinner—the magic touch of the inspired hostess—the glow and sparkle of fine glassware. What a tumult of joy duck days bring!

If it is Heisey's ◊ Glassware then you *know* you have the finest. Here are fascinating shapes and exquisite designs; delicate tints and brilliant crystal; the bell-like ring of perfect clearness. *For Heisey creates superb quality only.*

Ask your Dealer to show you Heisey's ◊ Glassware. Look for the ◊ trade mark. See the complete sets in dainty *Moon Gleam* and *Flamingo* colors.

Descriptive folder and booklet of recipes from famous chefs sent upon request.

A. H. HEISEY & CO. - Newark, Ohio

Recipe for

Long Island Duckling, Bigarade

By ANTHONY GIACOFCI, Chef
The New Willard Hotel, Washington, D. C.

Take one five-pound duckling and prepare for roasting. Roast for forty minutes in quick oven; baste well while cooking.

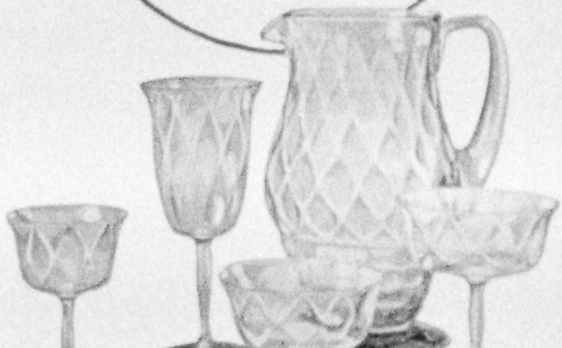
When done, take from oven and cut in ten pieces, six from breast and two from each leg.

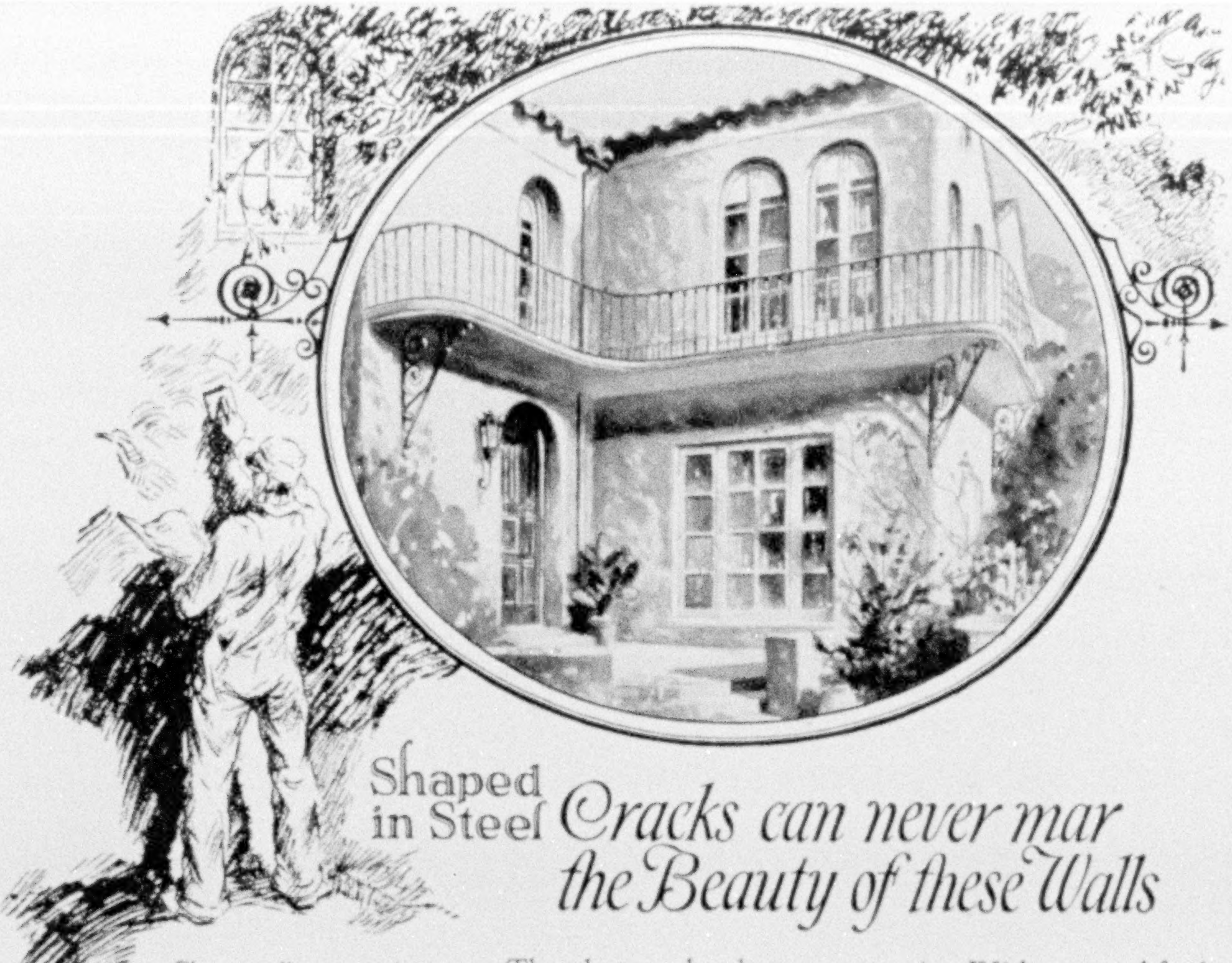
Add a spoonful of currant jelly to a pint of brown sauce from duckling. Cut julienne the rind of two oranges and one lemon. Partly boil in sauce; then add juice of one orange.

Put sauce over duckling and boil in saucepan fifteen minutes. Serve in platter decorated with quarter oranges.

HEISEY'S

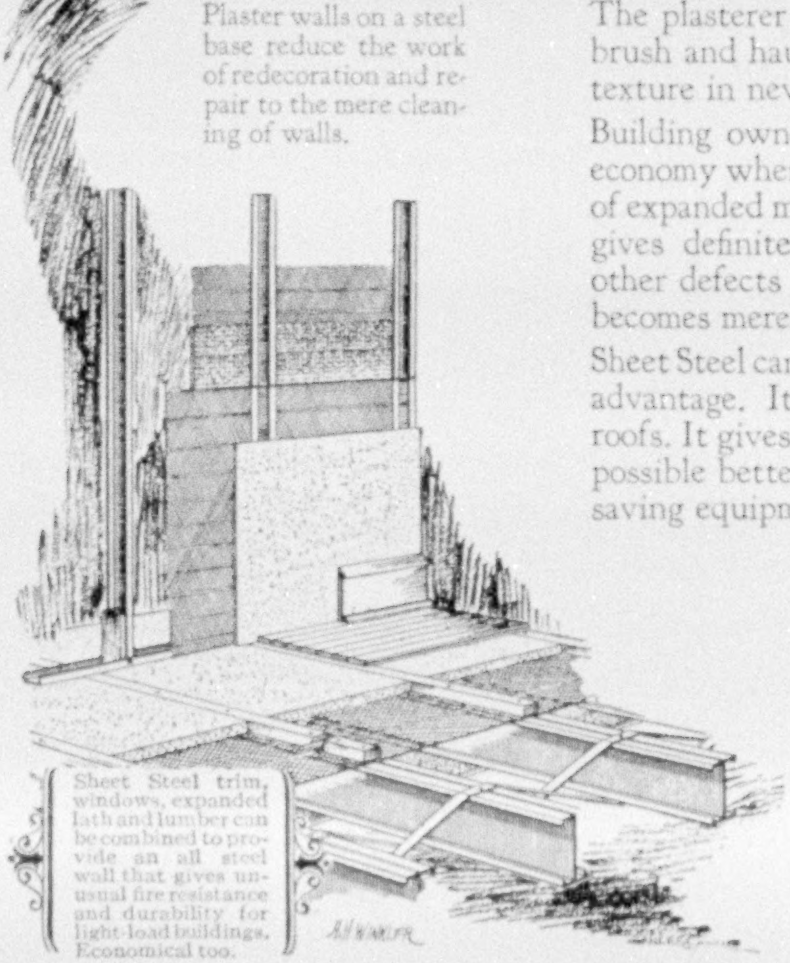
GLASSWARE ◊H◊ *for your Table*





Shaped in Steel

Cracks can never mar the Beauty of these Walls



Plaster walls on a steel base reduce the work of redecoration and repair to the mere cleaning of walls.

Sheet Steel trim, windows, expanded lath and lumber can be combined to provide an all steel wall that gives unusual fire resistance and durability for light-load buildings. Economical too.

The plasterer has become an artist. With a trowel for his brush and hauck for palette, he now combines color and texture in never ending variety.

Building owners are finding this new beauty an actual economy when the plaster is reinforced with a steel base of expanded metal lath made from Sheet Steel. Metal lath gives definite protection against cracks, lath-marks and other defects that involve upkeep expense. Redecoration becomes merely a matter of washing walls.

Sheet Steel can be used in many other ways to the builder's advantage. It provides fire-resistance and lightning safe roofs. It gives light-weight, economical cornices. It makes possible better heating systems, safer garages, and labor-saving equipment.

Our booklet, THE SERVICE OF SHEET STEEL TO THE PUBLIC *contains many interesting suggestions. For a copy or further information on specific problems, address the* SHEET STEEL TRADE EXTENSION COMMITTEE, OLIVER BLDG., PITTSBURGH, PA.

MASTER TEC BRAND

This trade-mark stenciled on galvanized Sheet Steel is definite insurance to the buyer that every sheet so branded is of prime quality—full weight for the gauge stamped on the sheet—never less than 28 gauge—and that the galvanizing is of the full weight and quality established by the Sheet Steel Trade Extension Committee specification.

SHEET STEEL

FOR SERVICE

No Coal Shovel Was Ever Made *To* Fit *a Woman's* Hand

IT'S not only wrong for a woman to have to shovel coal, but it's expensive!

For now that the benefits of oilomatic heat may be had, usually at no extra cost, coal shoveling is unprofitable, *no matter who does it!*

It follows then, that the longer you put off enjoying oilomatic heat, the more it actually costs you. Not in money alone, but in deferred comforts.

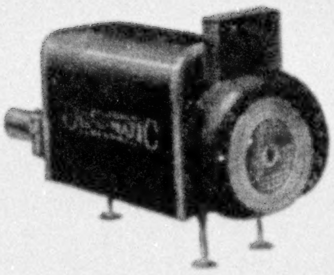
Even those whose costs do run slightly higher never go back to the old laborious method.

Comfort is beyond price

For solid comfort has no set price. Who will say just what constant, even heat is worth? Or what market value relief from all thought and care of the furnace has?

To be free to leave the house for any period means a great deal to some folks. But to have the curtains, rugs and walls stay clean is prized by every woman. To have comfortable rooms in the early fall and late spring is a treat too rare in the coal heated home.

What is more comfort-giving than waking on a bitter morning, to find every room just the right temperature! Particularly without having had someone jangle the furnace grates at dawn when every wink of sleep is precious. No, such comforts are not to be measured in terms of money. Yet Oil-O-Matic owners revel in them.



No part inside the firebox

For houses of every size

Whether your house be of 35 rooms or 5, you may have oilomatic heat. In any type of good heating plant—steam, hot water or a warm air furnace.

The Underwriters' Laboratories list it as standard to burn fuel oil. This distinction may be due to the fact that Oil-O-Matic operates according to the four natural laws of oil combustion. And no part is inside the firebox. For seven years it has proved the soundness of these principles.

Operating cost is lower

Fuel oil costs less than lighter oils and contains more heat units per gallon. So a random purchase of an oil burner may mean that you are paying for an Oil-O-Matic without enjoying its services.

The character of the local oilomatician is further assurance of uninterrupted service. He is a graduate of the Williams Institute of Heat Research, trained in all the phases of oil heat and applied heating.

He has the financial resources, experience and facilities that you would expect the world's largest manufacturer to demand from each member of his dealer organization.

A very small payment down puts oilomatic heat in your home. The balance may be spread over a whole year if you prefer.

Valuable book sent free

All that you need do now, is investigate. See how luxurious oilomatic heat is. Decide then, whether you want to go through another winter like the last. Or why right now isn't a good time to begin living in comfort.

The coupon below brings you a copy of our newest edition of "Heating Homes With Oil." No other book on the subject has attracted so much attention. Profusely illustrated in colors. Clip and mail coupon now. The book is sent you free and postpaid.

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World's Largest Producer of Automatic Oil Burners

Williams Oil-O-Matic Heating Corp.
Bloomington, Ill.

Without obligation, please send me "Heating Homes With Oil," by return mail.
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Name ....

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City .... *State* ....

Doors and Floors

—and Long-Bell Douglas Fir

The outer charm of doors and floors should have that permanency given them by *good construction throughout.* That is the reason Long-Bell trade-marked Douglas Fir, carefully manufactured as it is, makes the ideal combination in construction with Long-Bell oak flooring and Long-Bell doors. Use Long-Bell trade-marked Douglas Fir lumber.

* * *

The small home as well as the large requires oak floors, not only for the sake of appearance and care, but for the more important advantage of maximum investment value.

* * *

Oak floors are ideal for schools, office buildings, store rooms and public buildings—many such buildings today having the advantages of Long-Bell oak flooring.

* * *

Long-Bell Doors take all finishes perfectly. They are well built, serviceable doors of proved excellence.

* * *

To Shippers

Boxes and containers made of *wood* give *safest service.*

WHAT will the doors and floors in the new home reveal to your friends?

Noticeable they are, from the front-door welcome to the last goodbye . . . doors and floors have a way of intruding on the attention . . . *charming they should be!*

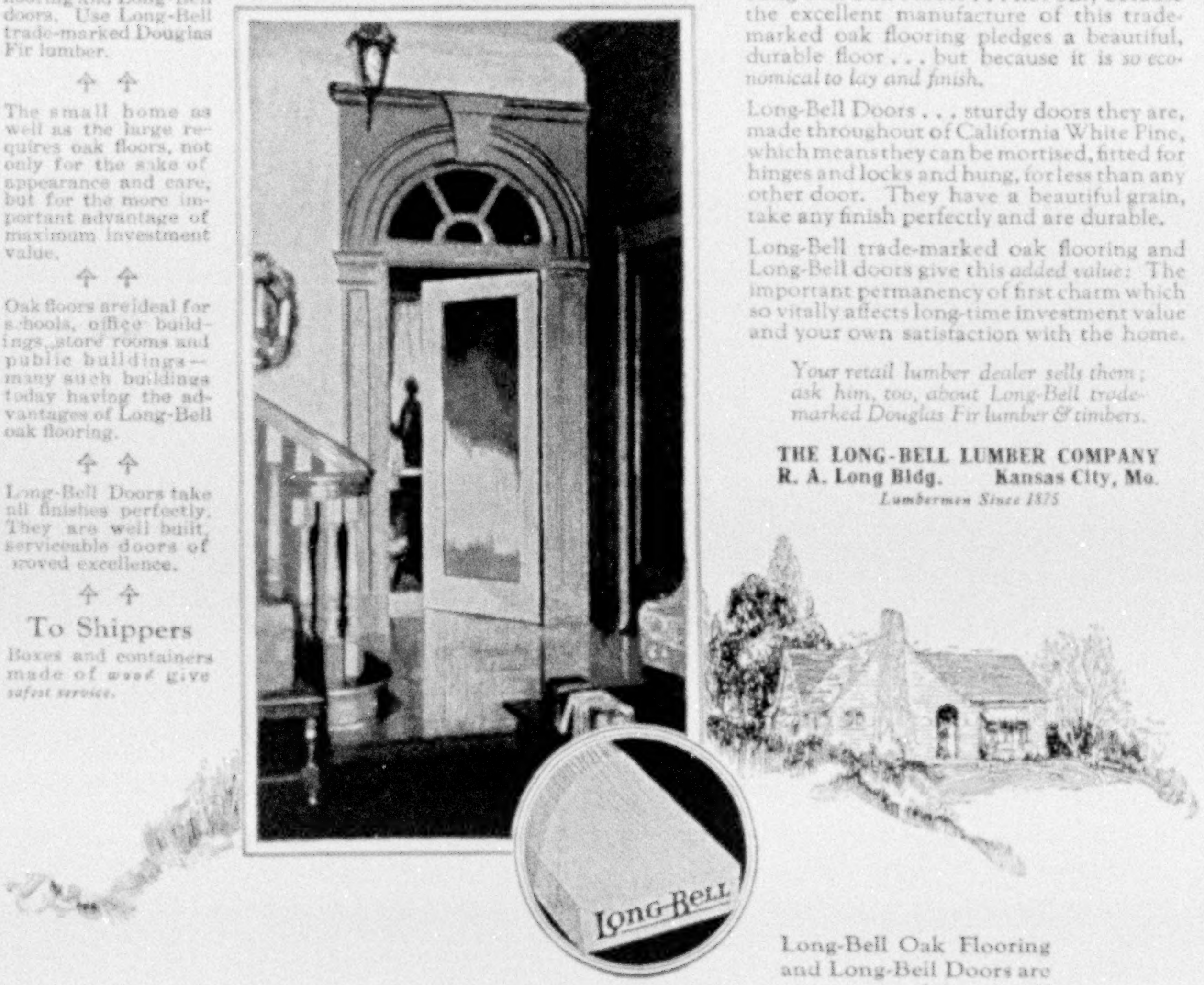
Good oak floors, to careful builders, imply Long-Bell Oak Floors . . . not only because the excellent manufacture of this trade-marked oak flooring pledges a beautiful, durable floor . . . but because it is *so economical to lay and finish.*

Long-Bell Doors . . . sturdy doors they are, made throughout of California White Pine, which means they can be mortised, fitted for hinges and locks and hung, for less than any other door. They have a beautiful grain, take any finish perfectly and are durable.

Long-Bell trade-marked oak flooring and Long-Bell doors give this *added value:* The important permanency of first charm which so vitally affects long-time investment value and your own satisfaction with the home.

Your retail lumber dealer sells them; ask him, too, about Long-Bell trade-marked Douglas Fir lumber & timbers.

THE LONG-BELL LUMBER COMPANY
R. A. Long Bldg. Kansas City, Mo.
Lumbermen Since 1875



Long-Bell Oak Flooring and Long-Bell Doors are economical for small home or mansion. They assure charming interiors.

LONG-BELL
Trade-Marked **LUMBER**

Douglas Fir Lumber and Timbers; Southern Pine Lumber and Timbers; Creosoted Lumber, Timbers, Posts, Poles, Ties, Guard-Rail Posts, Piling; Southern Hardwood Lumber and Timbers; Oak Flooring; California White Pine Lumber; Sash and Doors; Box Shooks.

KNOW THE LUMBER YOU BUY

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Proof Products
Glass-Paint-Varnish-Brushes

Condado-Vanderbilt Hotel
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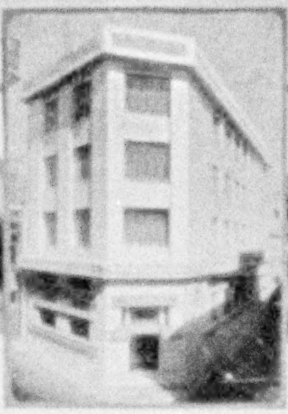
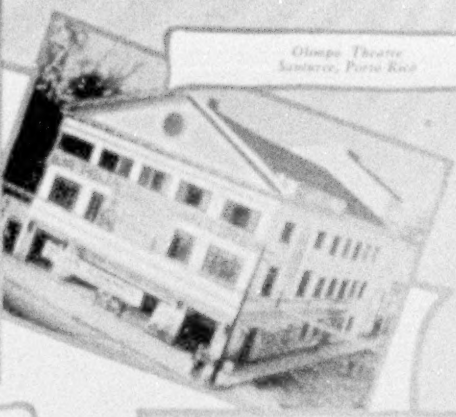
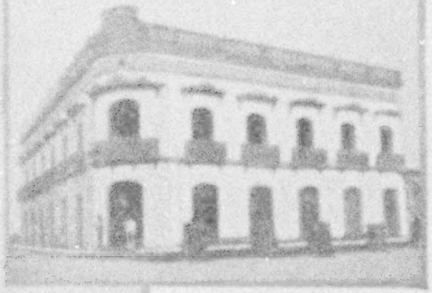

Bank of Nova Scotia Building
San Juan, Porto Rico


Olimpo Theatre
Santurce, Porto Rico


Main Building of Diego Martinez & Co.
Lorica, Colombia, So. America

Home of Senora Rosa Llaveras, Miramar,
San Juan, Porto Rico

IN every part of the world, palaces, fine residences, theatres, commercial buildings, hospitals, and churches have been beautified and protected by the use of Pittsburgh Products — Glass, Paint, Varnish and Brushes.

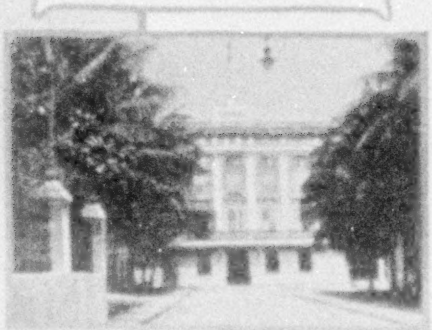
Velumina

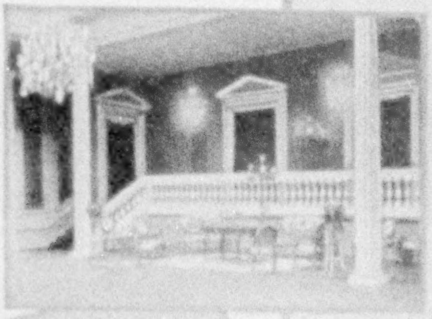
Washable Wall Paint

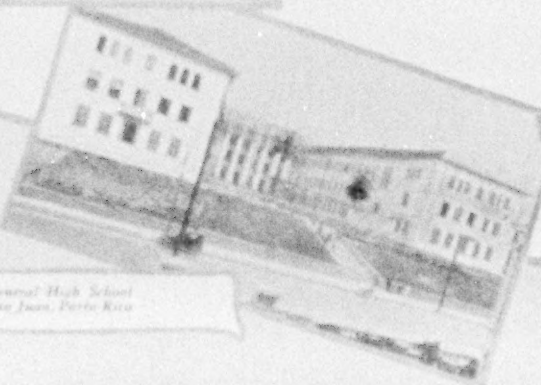
gives walls soft, uniform tones which diffuse light and lend spaciousness to interiors. No pores for grime to penetrate. Washing takes the place of redecorating.

Whatever you need — Glass, Paint, Varnish or Brushes — the Pittsburgh Plate Glass Company has a product that exactly fills your requirements. Sold by quality dealers; used by exacting painters.

"Guide to Better Homes" sent free —a valuable book on home furnishing and decoration. Write Dept. C, today.


Presidential Palace
San Juan, Porto Rico

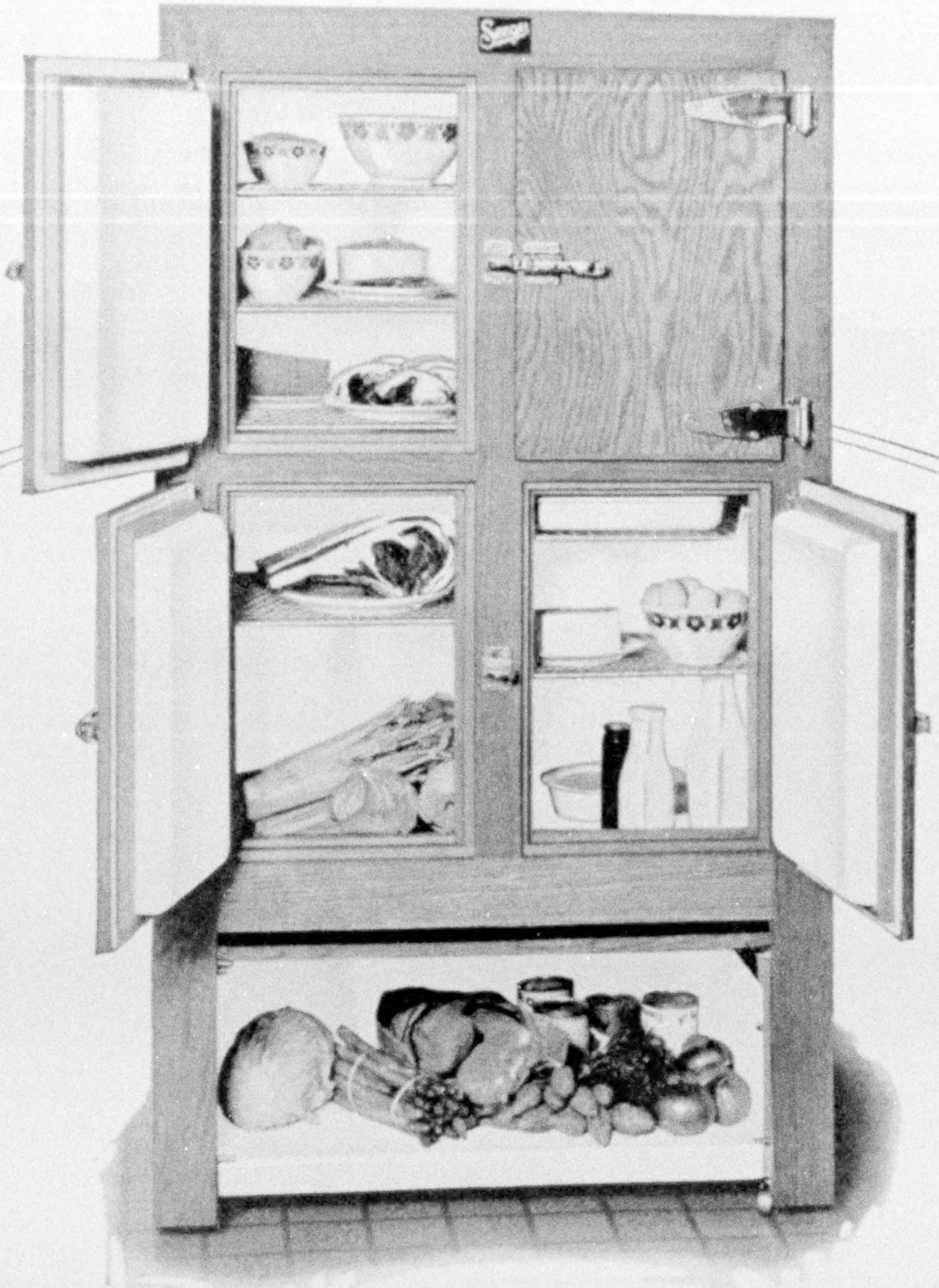

Government Palace
Lima, Peru


Central High School
San Juan, Porto Rico

"Miramar" Club
Cartagena, Colombia

PITTSBURGH PLATE GLASS CO.

Paint and Varnish Factories .... Milwaukee, Wis., Newark, N.J., Portland, Ore., Los Angeles, Cal.



Seeger

THE New Seeger, designed for Electrical Refrigeration, is exclusive in its many novel features, among them being: A Vegetable Storage Compartment that keeps vegetables fresh and full flavored; a Porcelain Defrosting Pan that eliminates the old style drainage; a Removable Porcelain baffle wall, for cleaning back of the cooling unit.

The Representatives of Electrical Refrigeration will be pleased to show and demonstrate the new Seeger.

The Seeger for use with ice will continue to be shown by usual representatives.

SEEGER REFRIGERATOR COMPANY
SAINT PAUL—NEW YORK—BOSTON—CHICAGO—LOS ANGELES—ATLANTA

Seeger
REFRIGERATOR
Standard of the American Home

Those Winning Smiles

Which mean so much commercially, socially, are gained this new way with gleaming white teeth and firm and healthy gums

WILL YOU GIVE
10 DAYS
to see how white your teeth are?

An amazing test will quickly show you how gloriously clear your teeth may be. How easily and quickly that dingy "off-color" look may disappear.

Simply send the coupon. A 10 days' supply of this scientific way will come by return mail.

HERE is a new and radically different way in tooth care. A way that quickly restores "off-color" teeth to attractive whiteness, that the world's leading dentists are urging.

In a few days it will work a transformation in your mouth. Your teeth will be clear and gleaming; your gums firm and of healthy color.

It's film that hides pretty teeth and imperils gums

Dental science now traces scores of tooth and gum troubles to a germ-laden film that forms on your teeth.

Run your tongue across your teeth and you will feel it—a slippery, viscous coating. That film absorbs discolorations from food, smoking, etc. And that is why your teeth look "off color" and dingy.

It clings to teeth, gets into crevices and stays. It lays your gums open to bacterial attack and your teeth open to decay. Germs by the millions breed in it. And they, with tartar, are a chief cause of pyorrhea.

It removes the film and Firms the Gums

Ordinary dentifrices and cleansing won't fight film successfully. Feel for it now with your tongue. Note how your present cleansing method is failing in its duty.

Now *new* methods are being used. A dentifrice called Pepsodent—different in formula, action and effect from any other known.

It accomplishes two important things at once: Removes that film, then firms the gums. No harsh grit, judged dangerous to enamel.

Send the coupon. A full 10 days' supply will be sent you if you write at once.

FREE
Mail this
for 10-Day
Tube

Pepsodent
The New-Day Quality Dentifrice
Endorsed by World's Dental Authorities

THE PEPSODENT COMPANY,
Dept. 718 1104 S. Wabash Ave. Chicago, Ill., U. S. A.

Send to ....

Address ....

City and State ....

Only one tube to a family 2185

The Pepsodent Co., Ltd., 137 Clarence Street, Sydney, N. S. W., Australia *Canadian Office and Laboratories: 191 George Street, Toronto, Canada*
London Office: 42 Southwark Bridge Rd., London, S. E.

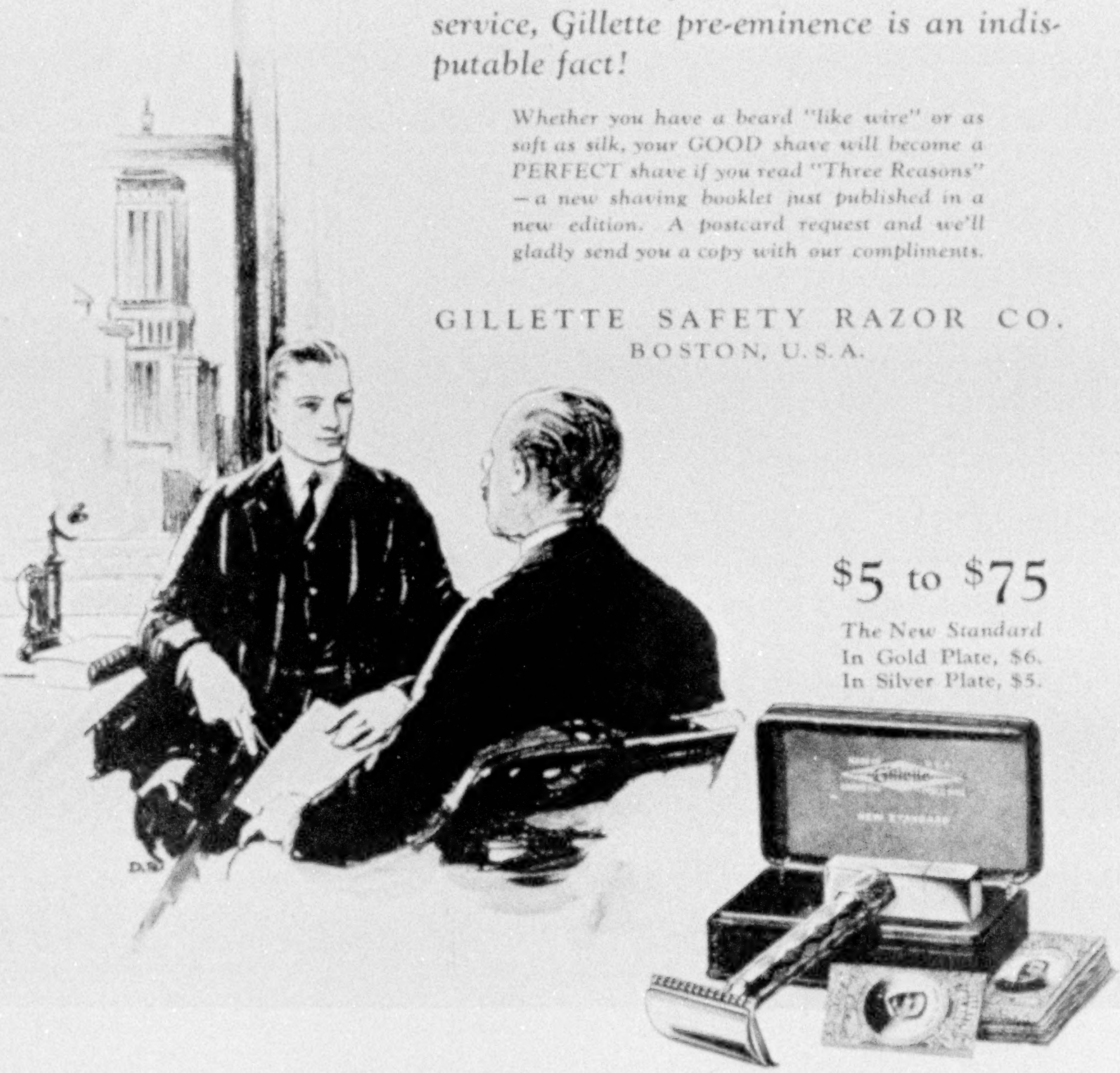
222 out of 325 Bankers express the usual preference—**Gillette**

BANKERS are famous for accuracy of judgment; their whole training and experience have taught them to be *sure* before passing an opinion.

So when actual interviews disclose that out of 325 bankers, 222 name the Gillette as the means they take to a smooth, comfortable shave, it is another proof that, *based on the perfection of its shaving service, Gillette pre-eminence is an indisputable fact!*

Whether you have a beard "like wire" or as soft as silk, your GOOD shave will become a PERFECT shave if you read "Three Reasons" — a new shaving booklet just published in a new edition. A postcard request and we'll gladly send you a copy with our compliments.

GILLETTE SAFETY RAZOR CO.
BOSTON, U.S.A.



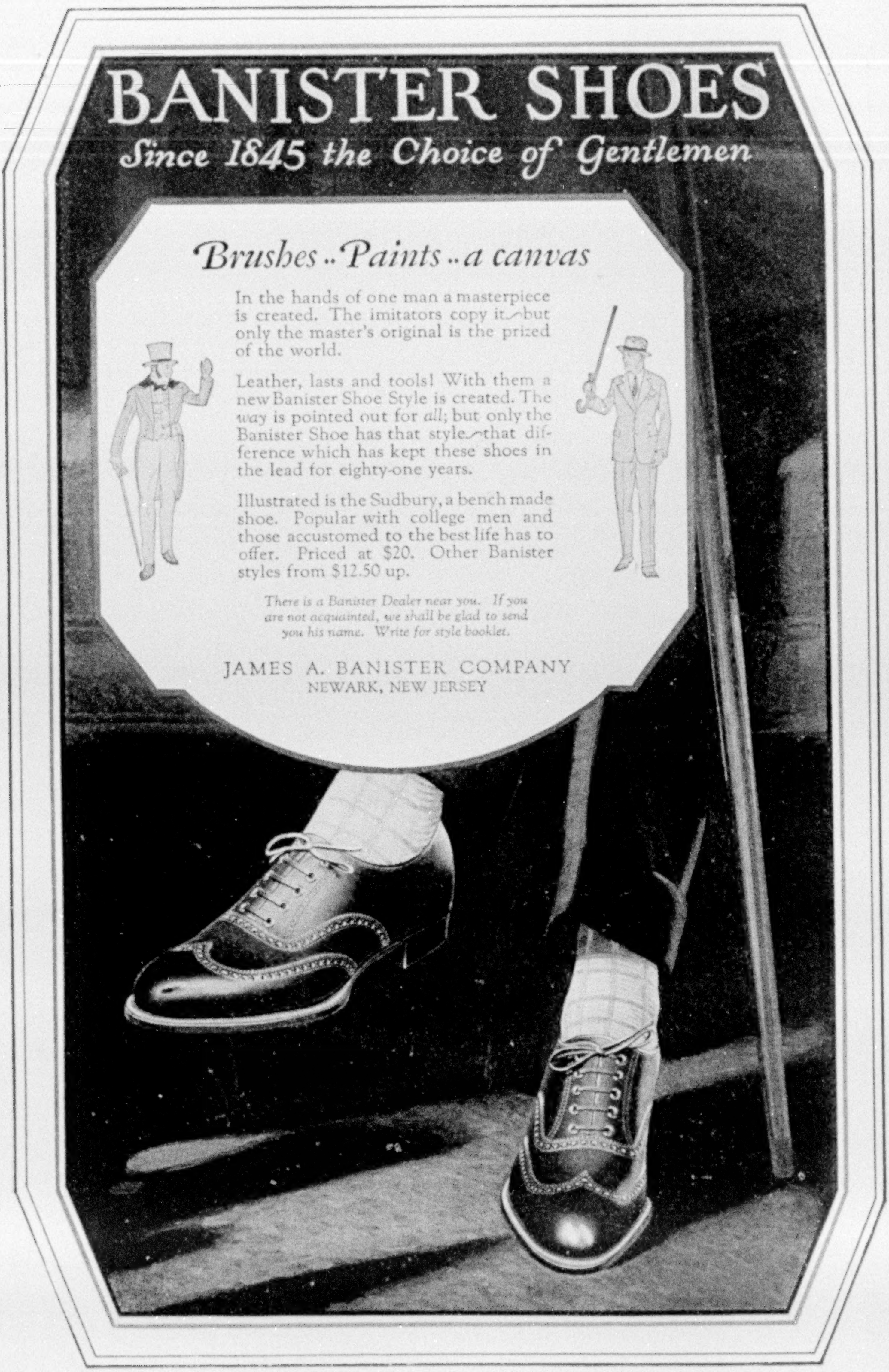
$5 to $75

The New Standard
In Gold Plate, $6.
In Silver Plate, $5.

The New Improved **Gillette**

SAFETY ◆Gillette◆ RAZOR

THE QUALITY RAZOR OF THE WORLD



BANISTER SHOES

Since 1845 the Choice of Gentlemen

Brushes .. Paints .. a canvas

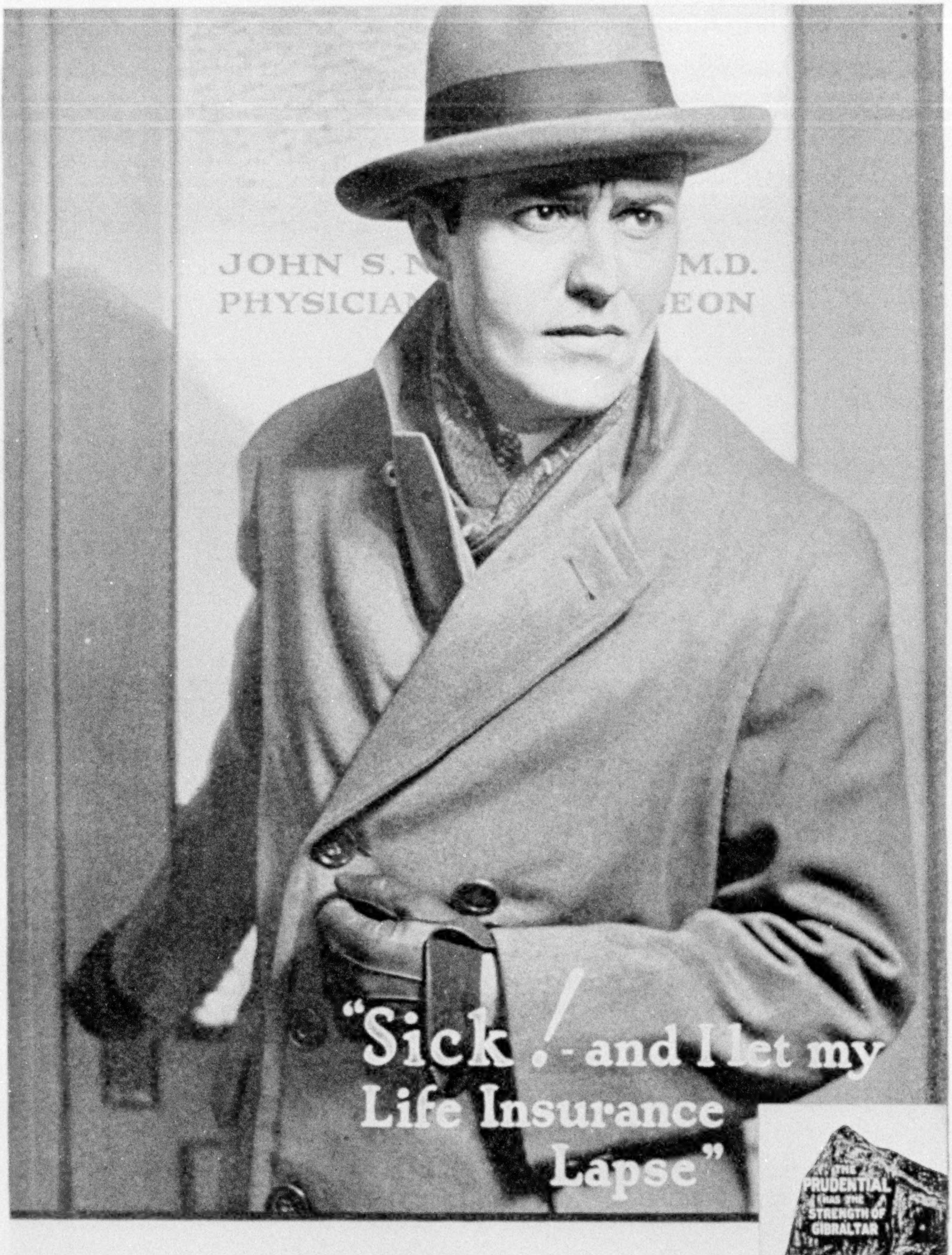
In the hands of one man a masterpiece is created. The imitators copy it—but only the master's original is the prized of the world.

Leather, lasts and tools! With them a new Banister Shoe Style is created. The *way* is pointed out for *all*; but only the Banister Shoe has that style—that difference which has kept these shoes in the lead for eighty-one years.

Illustrated is the Sudbury, a bench made shoe. Popular with college men and those accustomed to the best life has to offer. Priced at $20. Other Banister styles from $12.50 up.

There is a Banister Dealer near you. If you are not acquainted, we shall be glad to send you his name. Write for style booklet.

JAMES A. BANISTER COMPANY
NEWARK, NEW JERSEY


JOHN S. N M.D.
PHYSICIAN EON
THE PRUDENTIAL HAS THE STRENGTH OF GIBRALTAR

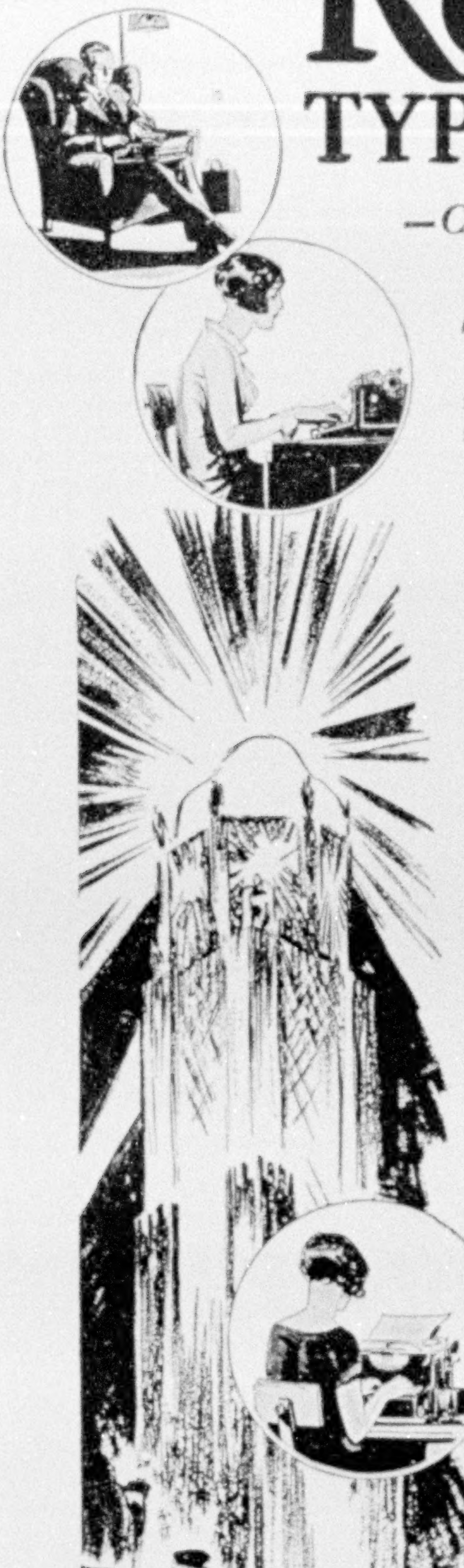
"Sick!- and I let my Life Insurance Lapse"

THE PRUDENTIAL INSURANCE COMPANY *of* AMERICA

EDWARD D. DUFFIELD, *President* HOME OFFICE, *Newark, N.J.*

Remington TYPEWRITERS

A MACHINE FOR
EVERY PURPOSE



—*Celebrate Fifty Years of Progress at the Sesqui-Centennial*

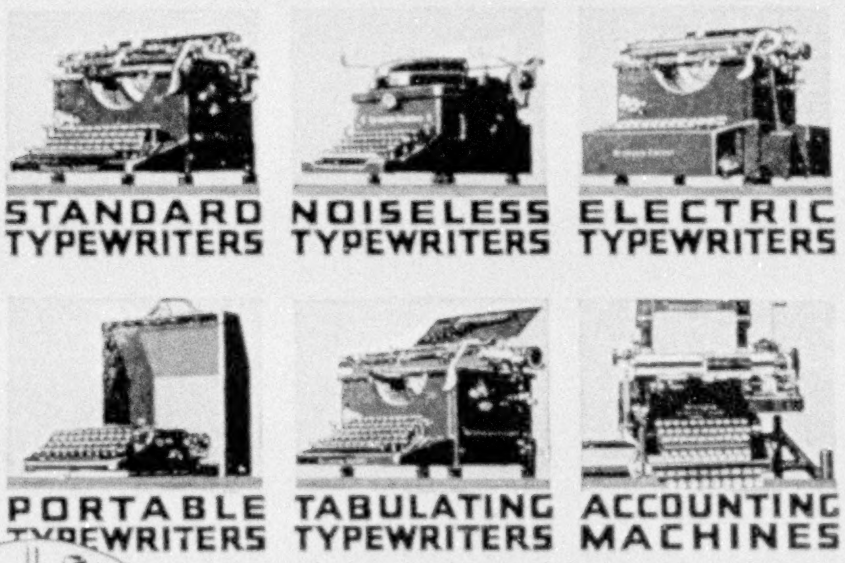
THE Half Century from the Philadelphia Centennial of 1876 to the Sesqui-Centennial of the present year constitutes a remarkable period in Remington Typewriter history.

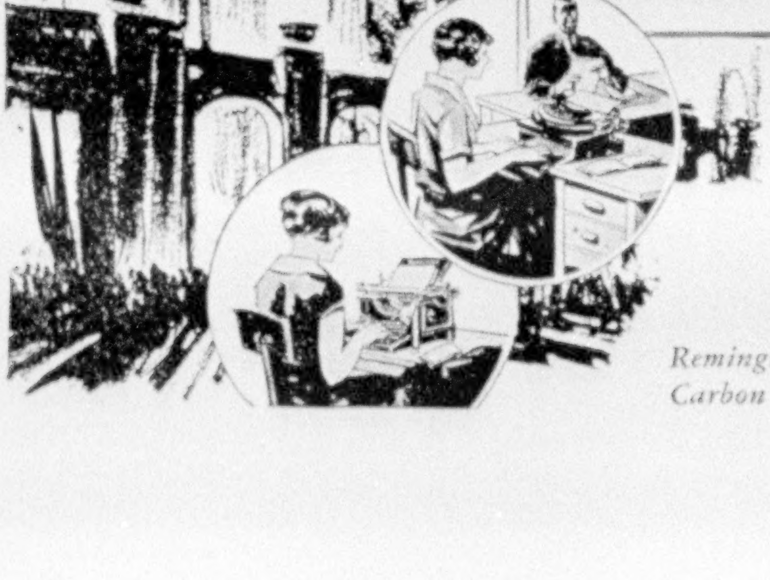
It was at the Centennial fifty years ago that the Model 1 Remington, the first practical typewriter, made its initial public appearance. The machine was then a curiosity, and visitors to the exposition purchased samples of its work for twenty-five cents apiece.

The period between these two great expositions has witnessed the conquest of the entire world by the writing machine, and the Remington Typewriter today is a universal necessity of modern business and modern life. This great record of progress has been recognized in the designation of the Remington as the *Official Typewriter of the Sesqui-Centennial Exposition.*

The outstanding feature of the Remington Typewriter Line in this Sesqui-Centennial year is its universality—for it is the one typewriter line which includes *a Machine for Every Purpose.*

REMINGTON TYPEWRITER COMPANY, 374 Broadway, New York
Branches Everywhere
Remington Typewriter Company of Canada, Ltd., 68 King Street, West, Toronto





REMINGTON Typewriter representatives are more than mere salesmen. They are trained and efficient counselors, equipped to diagnose every office problem and to recommend just the right Remington machines for each requirement of any line of business.

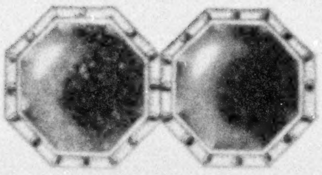
Remington-made Paragon Ribbons and Red Seal Carbon Papers always make good impressions

KREMENTZ CORRECT
EVENING JEWELRY

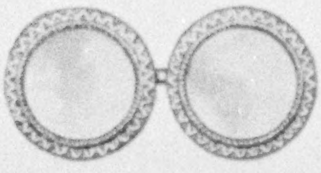
Your boy should have two

PACKED in his bag when he goes away should be one set of Krementz Evening Jewelry for full dress and one set for tuxedo. The prescribed form is white mother-of-pearl for full dress; dark mother-of-pearl for tuxedo. *Vest buttons must always match studs and links.* Make these your personal gift to him so that on the happy occasions when he wears them, your thoughtfulness and affection will have assured him of *correct* evening jewelry. At your dealer's. Write us at Newark, New Jersey, for booklet with Correct Dress Chart.

Krementz

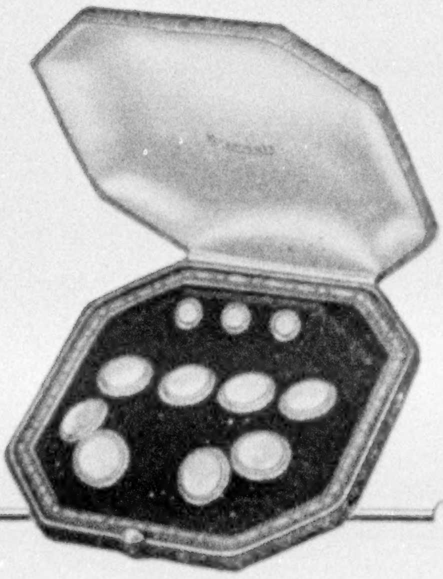


Set No. 1738, Krementz quality white metal rims, black enamel centers. Pair links, 3 studs, 4 vest buttons . . . In box $11.50



Set No. 1488, Krementz quality rolled white gold plate rims, white mother-of-pearl centers. Pair links, 3 studs, 4 vest buttons . . . In box $11.50

The
BODKIN-CLUTCH
GOES IN LIKE A NEEDLE
HOLDS LIKE AN ANCHOR



COME UP TO
ASHEVILLE
N.C.
In the Land of the Sky

Towering Peaks - A Scenic Wonderland - Superb Golf - All Out Door Sports
Investment Opportunities

Write for descriptive Literature
Asheville Chamber of Commerce
Asheville, N.C.

A Garden Full of Darwin Tulips

EUROPE
PRIDE OF HAARLEM
CLARA BUTT

for $2.00

In anticipation of again placing before our customers a collection of Darwin Tulips we have had a sufficient quantity grown so that we can offer

50 Giant Darwin Tulip Bulbs, Finest Mixed, for $2.00
selected from fifteen named varieties

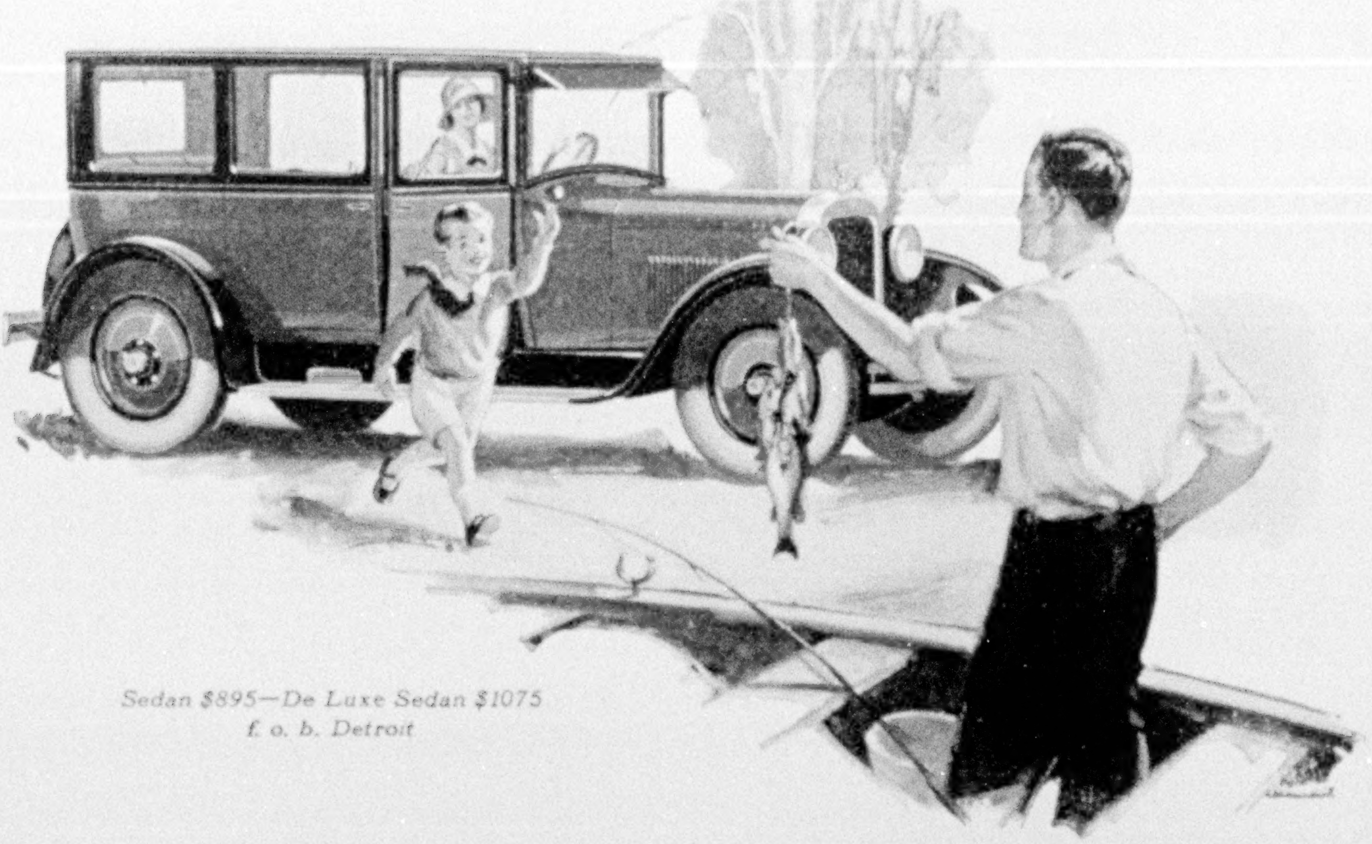
Few spring flowering plants rival the Darwin Tulip for brilliance of bloom. Borne on strong stems often exceeding three feet. They are a wonderful addition to the flower garden.

Plant any time before the ground becomes frozen, and they will bloom from the middle of May to Decoration Day

Mention this advertisement and send check, money order, cash or stamps and secure this exceptional collection, sent prepaid to any point in the U. S. east of the Mississippi. For points West and Canada add 25c ($2.25).

Our 1926 Fall Bulb Catalogue sent on request

Stumpp & Walter Co
30 and 32 Barclay Street New York



Sedan $895—De Luxe Sedan $1075
f. o. b. Detroit

Unseen Sources of Long Life

An open book to the expert - - - -
And revealed to the Owner in terms of Service

The basic sources of motor car value are not always apparent to the eye.

A motor car, like a house, may *look* more substantial than it really is.

But *experts* know. And Dodge Brothers Motor Car, subjected to their sharp scrutiny, has received the unqualified endorsement it so richly deserves.

Electrical Engineers, for instance, will tell you that Dodge Brothers starter and electrical equipment throughout, are exceptionally efficient and dependable.

Metallurgists will confirm the fact that in no other car built is so high a percentage of costly chrome vanadium steel employed.

Tanners will tell you that Dodge Brothers, for their leather upholstery, will accept only a distinctly superior grade of stock. Upholsterers concede that you will rarely find mohair velvet of equal quality and taste.

Automotive Engineers point to Dodge Brothers one-piece chrome vanadium front axle—a valuable and exclusive feature; to the bearings—bigger and better than strict necessity requires; to the spring leaves and spring clips—chrome vanadium, *every one*; to the motor, connecting rods, crankshaft, transmission, universal joint, drive shaft, differential, rear axle shaft—all made chiefly of chrome vanadium; and to numberless other examples of high engineering standards long ago established and strictly maintained today.

Sources of *long life* and *dependability* that reveal themselves to the owner in terms of upkeep dollars saved, and faithful service over a period of years.

DODGE BROTHERS, INC. DETROIT
DODGE BROTHERS (CANADA) LIMITED
TORONTO, ONTARIO

DODGE BROTHERS
MOTOR CARS

"It's Surprising how long the curtains Stay Clean~

When You Have Chamberlin Metal Weather Strips"

Owners of homes equipped with Chamberlin Metal Weather Strips invariably comment on the surprising length of time that their curtains, drapes, and furnishings remain fresh and clean. Chamberlin Metal Weather Strips bar out rain—and the dust, soot and grime that ordinarily sift in around doors and windows—and which double house work and cause costly depreciation. They also save from 20 to 40% in yearly heating bills.

Chamberlin Inside Door Bottoms are also indispensable. They seal clothes closets from dust—keep kitchen and laundry odors where they belong—and prevent under-door draughts. Your home needs Chamberlin equipment—and now is the best time to install it.

Lifetime Guarantee

Chamberlin guarantees and services its product for the life of your building. Detailed information will be sent on request. Use the coupon.

CHAMBERLIN
METAL WEATHER STRIP CO.
West Lafayette Blvd., Detroit, Mich.
100 Sales and Service Branches throughout the United States

CHAMBERLIN METAL WEATHER STRIPS
"SINCE 1893-THE STANDARD"

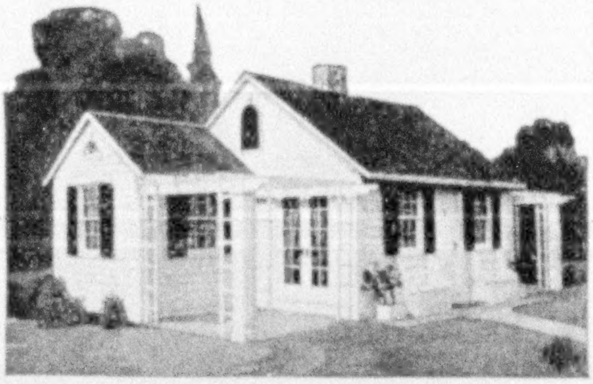
Chamberlin Metal Weather Strip Company
West Lafayette Blvd., Detroit, Michigan

Please send me literature on Chamberlin Metal Weather Strips and Inside Door Bottoms. Also an approximate estimate for weather stripping my home which has ________ windows and ________ doors.

Name ____________________

Address ____________________

City __________ State __________ FC-72



A Little House all their own for YOUR GUESTS

What could be *sweeter*—or more expressive of *real hospitality?* And it is coming to be *just the thing* now in most fashionable places.

The "Piping Rock" (shown above) is one of our most popular models, named after the famous Society Country Club of Long Island.

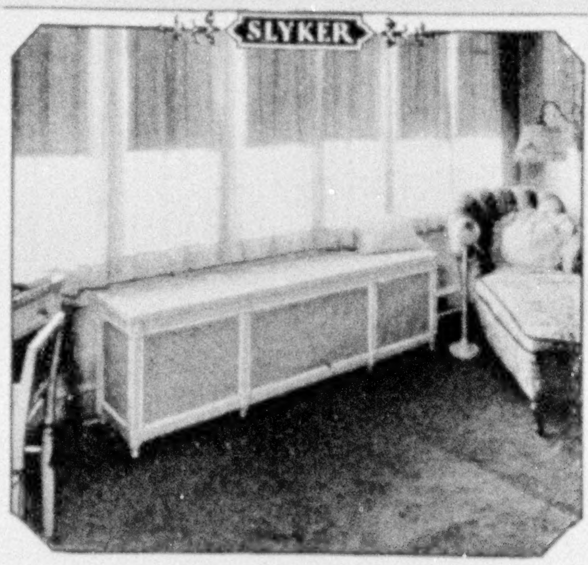
Large, comfortable living room, 18 x 9 ft.; 2 light and airy bedrooms, with windows on three sides, 12 x 9 ft.; kitchen, 6 x 9 ft., and bath, 6 x 9 ft. Living room has casement doors at each end opening on pergolas. Pierced panel shutters on all windows.

Two people can erect the "sectional" home without experienced help. ***Right now,*** send for free catalogue showing this and many other beautiful BOSSERT HOMES.

"Ready Cut"
$1213
"Sectional"
$2205
F. O. B. Brooklyn

LOUIS BOSSERT & SONS, Inc.
Largest Lumber Plant in the East
1313 Grand St. (House Dept.) Brooklyn, N. Y.

SLYKER • • *"Found in America's Finest Homes"*



SLYKER-TREATED RADIATORS

eliminate soiled walls, ruined draperies and redecorating expenses. SLYKER "Metal" Radiator Furniture built of all steel to last a lifetime has period designs; is custom-built to fit, beautifully surfaced in enamel and has a humidifyer to keep the air healthy. Open types—*$15.00 up.* Complete enclosures—*$50.00 up.* Full details from SCHLEICHER, *Inc.*, Gary, Ind.

SLYKER
Metal
RADIATOR FURNITURE
In Period Designs

Sky-high *or* cottage-low

lead paint withstands all weather

LEAD PAINT PROTECTS and beautifies the city skyscraper. And out where the grass begins, lead paint brightens and preserves the smallest country cottage.

The trained industrial builder, the careful small-house owner — both use paint made with pure Dutch Boy white-lead. The reason? If you ask your painter he will tell you several.

It costs little. Even tho Dutch Boy white-lead is made from the metal lead, its cost is low enough to satisfy those who closely scan appropriations, those whose household budgets are limited.

It goes far. One hundred pounds of all-lead Dutch Boy white-lead makes seven gallons of paint. These seven gallons will cover, one coat, from 3900 to 4500 sq. ft. of surface.

Any quantity can be mixed. There's no waste. Mix just the quantity needed for a job—a half-pint or twenty gallons. It can be bought, too, from small one-pound tins to 100-pound kegs.

Have the colors you like. A greenish blue, a shadowy gray—all the tints and tones of the rainbow are possible with Dutch Boy white-lead. The tinting job is easy. You save money, and get the color you want.

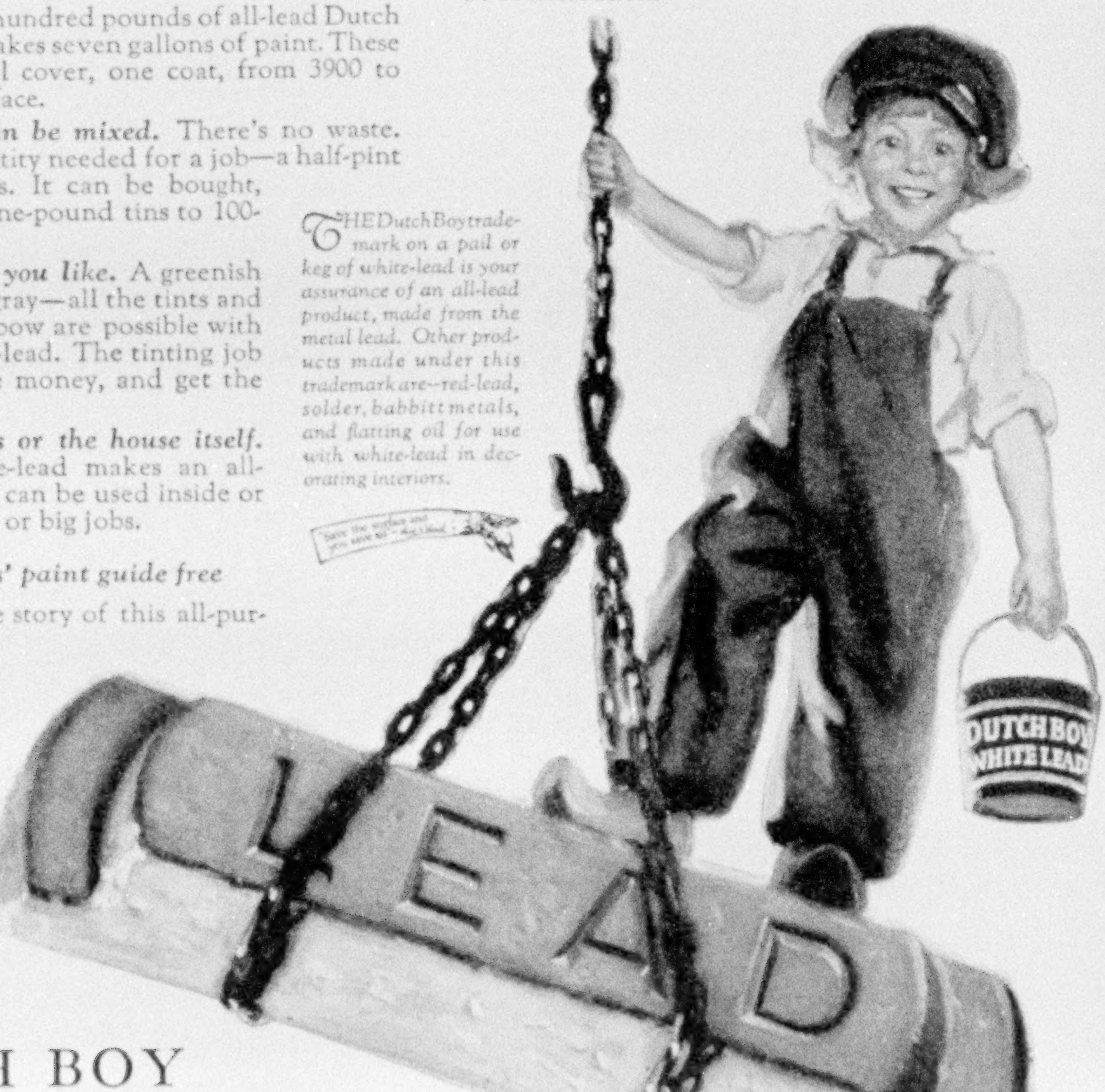
For porch chairs or the house itself. Dutch Boy white-lead makes an all-purpose paint. It can be used inside or outside, odd jobs or big jobs.

Home-owners' paint guide free

It tells the whole story of this all-purpose, all-lead paint. Color illustrations of special outside and interior effects, correct paint formulas, and money-saving handy hints make this book well worth a letter. Just write to our Department of Decoration in care of our nearest branch and ask for "Decorating the Home." Any special questions will also be gladly answered by this department.

NATIONAL LEAD COMPANY

New York, 111 Broadway • Boston, 131 State Street • Buffalo, 116 Oak Street • Chicago, 900 West 18th Street • Cincinnati, 659 Freeman Avenue • Cleveland, 820 West Superior Avenue St. Louis, 722 Chestnut Street • San Francisco, 485 California Street • Pittsburgh, National Lead & Oil Co. of Penna., 316 Fourth Avenue • Philadelphia, John T. Lewis & Bros. Co., 437 Chestnut Street.



THE Dutch Boy trademark on a pail or keg of white-lead is your assurance of an all-lead product, made from the metal lead. Other products made under this trademark are--red-lead, solder, babbitt metals, and flatting oil for use with white-lead in decorating interiors.

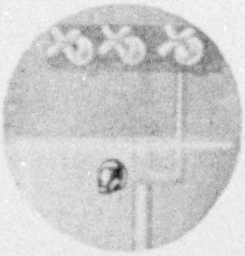
DUTCH BOY

WHITE-LEAD

Makes an All-Lead Paint

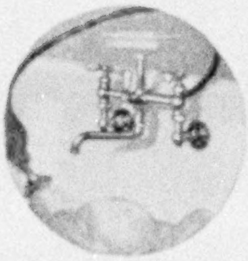
The
SPEAKMAN
LINE

The H 2370. Combination of H 952½ Mixometer Shower and Deshler Bath Fixture



H 2460. The Deshler Bath Fixture

H 2266. Unit Lavatory Fixture



H 1894. Swing Nozzle Sink Fixture with Hose and Spray Head

THE Speakman Line of Brass Plumbing Fixtures includes every imaginable type of shower; Bath Fixtures for every kind of tub; one-nozzle Lavatory Fixtures for every make of lavatory and swinging nozzle Sink Fixtures to meet every need and requirement.

All of these products are handled by nearly 20,000 plumbers and practically every large wholesale plumbing supply dealer in the United States.

Folders and literature describing any part of the Speakman line will be sent promptly upon request. Use the coupon, if more convenient.

SPEAKMAN COMPANY
Wilmington, Delaware

SPEAKMAN SHOWERS
and FIXTURES

SPEAKMAN COMPANY, Wilmington, Delaware

Please send me folders and literature on the Speakman Line of Showers, Bath, Lavatory and Sink Fixtures.

Name ______________________________

Address ______________________________

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Binders!

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Quality Craftsmanship

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Merely specify the years or volumes wanted and they will be sent promptly. If you keep them the cost is only $2.00 each or $3.65 per pair. If not satisfied—return them at our expense.

**This offer limited to United States only.*

THE DAVID J. MOLLOY COMPANY
2863 N. Western Avenue, Chicago, Ill.

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Master Printers
ECKINGTON PLACE AND FLORIDA AVE.
WASHINGTON, D. C.

SPRATT'S
DOG MEDICINES

Recommended in the treatment of Distemper, Canker, Worms, Mange and other common dog diseases. Used by successful owners and breeders everywhere. As time-tried and reliable as the world-famous Spratt's Foods. *Consult your veterinarian.*

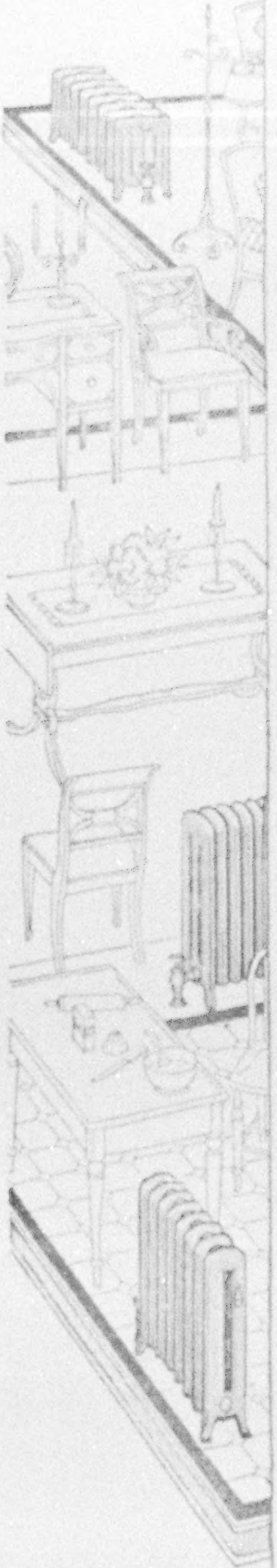
Write for this Free Book

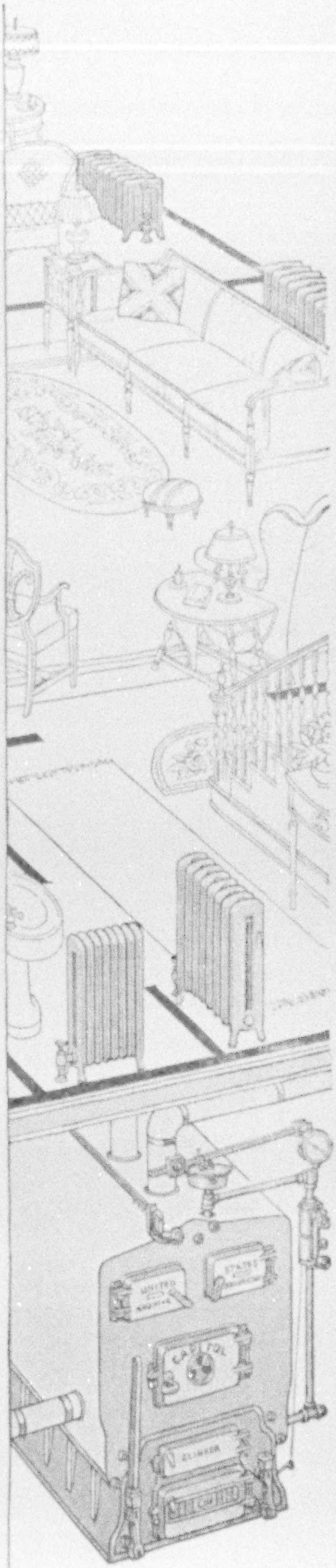
Every dog-owner should have a copy. Describes the symptoms and proper treatment of all the commoner dog ailments. Also contains valuable chapters on care and feeding. Sent free upon request.

SPRATT'S PATENT, Ltd.
Dept. N.G.-96 Newark, N.J.

SPRATT'S
CARE AND FEEDING OF DOGS

DEPENDABLE HEAT ALL OVER THE HOUSE WITH ECONOMY





You always come up smiling,

with Capitol guaranteed heating

There's something new under the sun—*Capitol guaranteed heating*. And it insures extra warmth when the wintry sun is low in the southern sky.

Burning now gently, now briskly, but ever thriftily, the Capitol Boiler is always equal to the demands of the cold and dreary winter. Because the exact amount of radiator-surface it will heat is guaranteed in writing, it never fails to provide care-free, cozy warmth. With ample reserve capacity, it hurries up the heat when icy blasts whine against the rattling windows. Night and morning as you quickly and easily fix the fire, the steady glow through the fire-box door tells you that coal and effort are both being saved.

If you ask your contractor to install *Capitol guaranteed heating*, you will always come up smiling. All the facts are in our illustrated book, "A modern HouseWarming." Free on request.

UNITED STATES RADIATOR CORPORATION
Detroit, Michigan
For 36 years, builders of dependable heating equipment

GUARANTEED HEATING

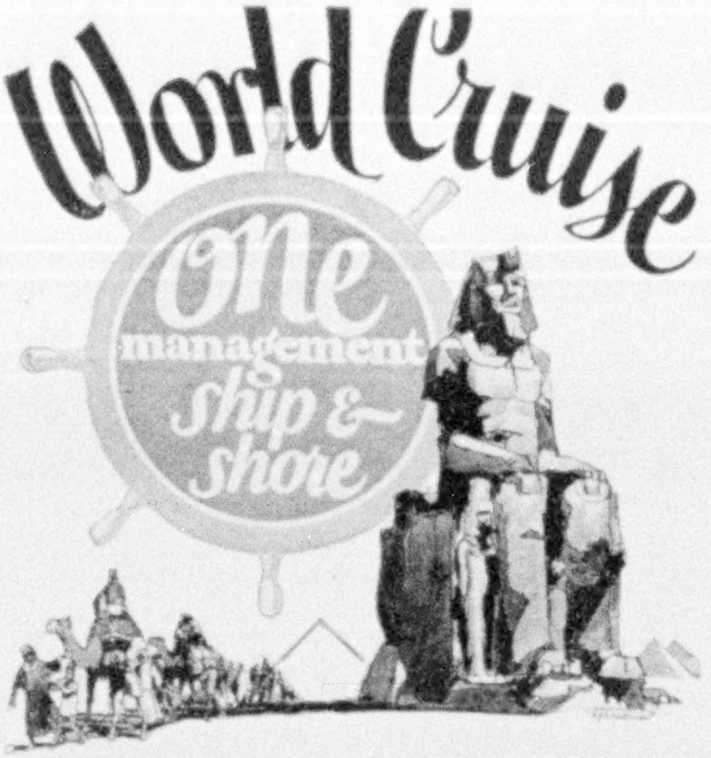
Your contractor receives a written guarantee on the heating capacity of every Capitol Boiler. No other heating equipment assures you satisfaction so definitely.

Capitol Boilers

and

UNITED STATES
RADIATORS

SUPPLIED AND INSTALLED NATIONALLY BY ESTABLISHED HEATING CONTRACTORS



FROM New York—on December 2nd, the Empress of Scotland puts to sea for the dream-ports of the world. For Madeira, Gibraltar, Algiers, Haifa, Bombay, Colombo! For Padang, Singapore, Hong Kong, Manila, Honolulu, Panama! For ports whose very names are romance! The cruise takes you to the Holy Land for Christmas—to Cairo for New Year's Eve. India at its cool height of season. 4 days in Peking. Japan for the plum-blossoms. Fascinating excursions at all ports included in fare. Mid-April will bring you home again. Always, on ship and shore, you'll have the comforting security of Canadian Pacific management.

"See this world before the next"

The ship is the Empress of Scotland, 25,000 gross tons. Only ¼ her usual capacity will be booked on this cruise. Literature from your local agent or Canadian Pacific—344 Madison Ave., N. Y.; Chicago, 71 E. Jackson Blvd.; Montreal, 141 St. James St. Principal cities, U. S. A. and Canada. Personal service if desired.

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The Sign of the World's Standard Piano Action

The Essential Factor In Piano Study

HALF the battle in piano study is acquiring *correct touch!* Start your child this Fall on a piano equipped with the Wessell, Nickel & Gross *piano action.* The perfect balance and delicate responsiveness of this fine action give little fingers an early advantage in establishing correct habits of touch.

There is another reason why you should ask your dealer for a piano equipped with the Wessell, Nickel & Gross action. This famous product—*the world's highest-priced piano action*—is found only in instruments of *proven merit.* You therefore make certain of obtaining a quality piano when you insist upon the Wessell, Nickel & Gross action.

WESSELL, NICKEL & GROSS
Established 1874 New York City

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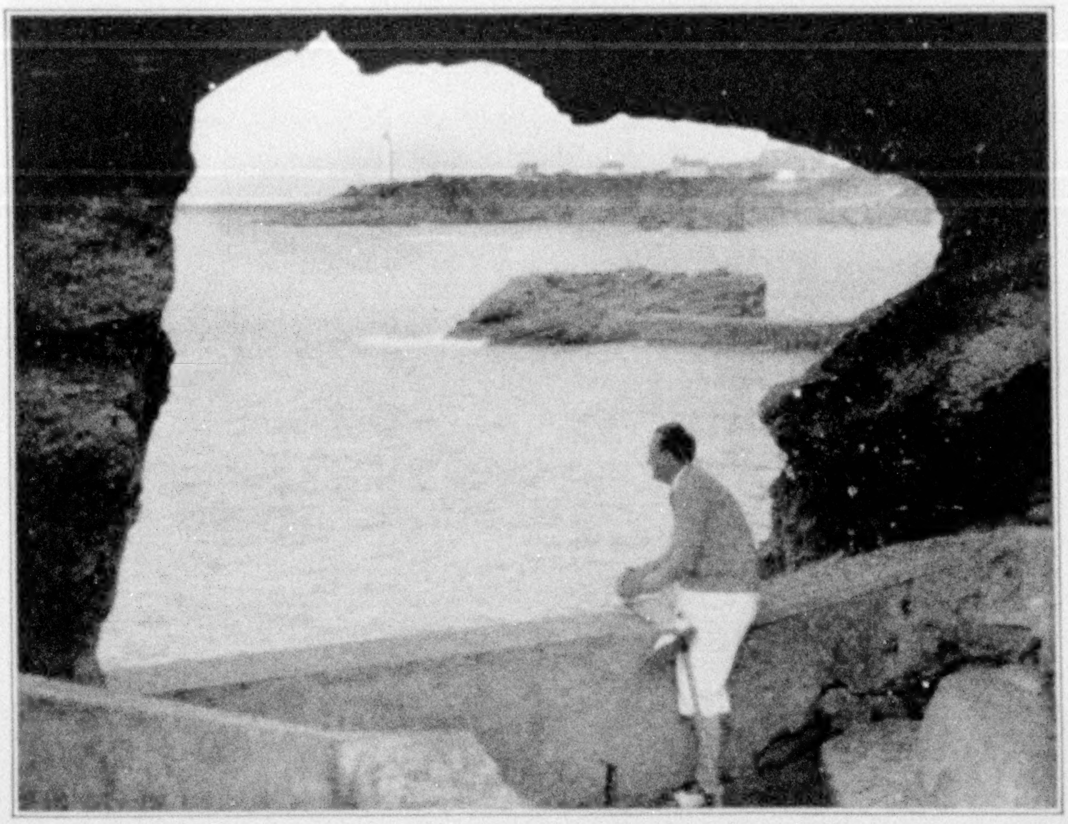
PERU, Indiana

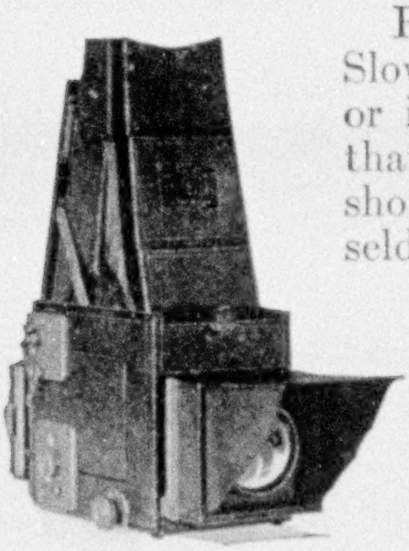
The traveler photographs many scenes that he may not soon revisit. He wishes each picture to be a success—he values the Graflex features that facilitate correct composition, timing and focus.



GRAFLEX

Vigor and sharpness mark Graflex pictures. *Certainty* distinguishes the Graflex method.

While making an exposure you watch in the hood a reflection of the subject. Until you trip the shutter the image is there, right side up and under control. You see at a glance whether focus is sharp.



Fast shutter speeds (up to 1/1000) catch exciting action. Slow speeds (down to 1/5) permit snapshots in the woods or indoors. The big anastigmat admits so much light that both extremes are useful. Detail is obtainable with shorter-than-ordinary exposures. Posing and pausing are seldom necessary—the picture has spirit!

The Latest Graflex

Cooke Anastigmat *f.*2.5, three times as fast as the fastest lens ever before offered on a Graflex, is a feature of the latest model. For sensational pictures, for scenes in dull light or in rain, this is the camera. Its full name is 3¼ x 4¼ Revolving Back Graflex, Series C. Price $260.

Other Graflex cameras from $58.50. Ask your dealer or write to Rochester.

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....192

To the Secretary, National Geographic Society,
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I nominate ....

Occupation ....
(This information is important for the records.)

Address ....

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for membership in the Society.

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Name and Address of Nominating Member

9-26

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Just sprinkle Sani-Flush into the toilet bowl. Follow directions on the can. Then flush. All marks, stains, incrustations vanish. Sani-Flush leaves white, gleaming porcelain clean as new.

Sani-Flush cannot harm the plumbing connections. Keep it handy in the bathroom always.

Buy Sani-Flush in new convenient punch-top can at your grocery, drug or hardware store, or send 25c for a full-size can. 30c in Far West. 35c in Canada.

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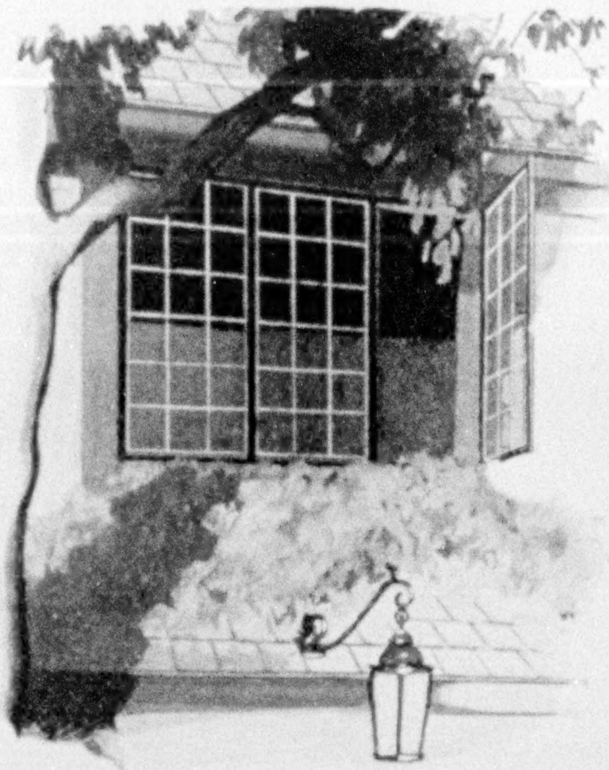

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Now Available at Low Cost

Plan for your home beautiful windows you can increasingly prize through the years.

The slender grace of fine steel casements adds to exterior beauty and at once suggests the inner charm and taste of the home.

The quality of Crittall Standardized Casements, their distinction and tone, their gracious adaptability to interior draping, are enjoyed long after their slight extra cost over wood windows is forgotten.

With their beauty are highly practical advantages—maximum light, ventilation and *guaranteed* weather-tightness. Easy to wash, they never warp or stick and always open and close easily.

Of the same quality and workmanship as Crittall custom-built types, their low cost makes them fully practical for homes of moderate cost.

Our catalogue showing how easily casement windows may be screened, draped and washed will be sent on request.

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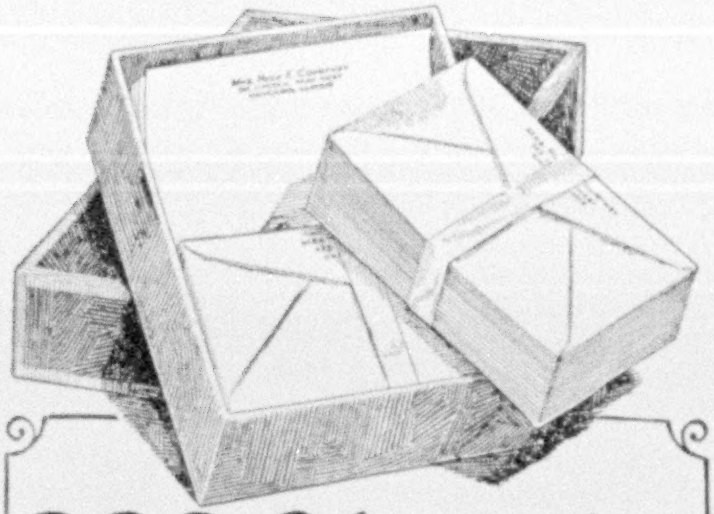
Manufacturers
10935 Hearn Avenue, Detroit, Michigan

CRITTALL
Standardized
Casements



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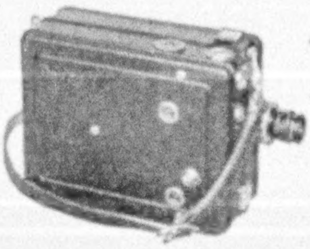

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The De Vry Corporation announces a new movie camera! At last, a motion picture camera with STANDARD FILM for your own private use! Clear-cut motion pictures in the home. You, too, now can take professional pictures and show them anywhere—theaters, churches, school houses, every place you see regular motion pictures — your children, friends, picnics, games, travel, the family circle—cherished pictures you want to preserve—in full theater size and clarity. Yet the price is lower than many motion cameras for amateur use that require "off-standard" narrow film which professionals do not use. Don't impair your negative by permitting it to be turned into a positive that you can't make clear prints from.

ASK YOUR DEALER

This wonderful new De Vry weighs only 9 lbs.! No tripod needed. Three view finders! Handsome, all-metal grained leather finished case. Size 8½ x 6½ x 3¾. Accurate, automatic footage meter. Also an amazing exclusive feature—an action lock that actually lets you get into the scene yourself or direct the action while the camera goes on recording.

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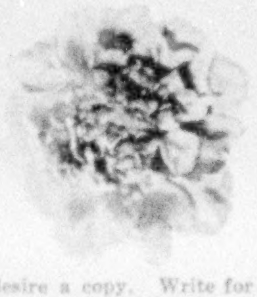
BRAND PEONIES



OUR new Peony and Iris Price List, which is the most complete and up to date list of Peonies and Iris we have ever issued, is just off the press. It submits a superb offering from

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It is being mailed out by us to all our old customers. It is free to those not on our mailing list who desire a copy. Write for it. We know that you will find it worth while.

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Contains a Grand

"How I wish I had learned to play the piano"

YOU have probably said that to yourself time and time again. Most people have.

Childhood is the time to begin a mastery of music. And fortunate is the child who, in early life, is taught to play and to understand beautiful music.

Music teachers endorse the Brambach Baby Grand as a most valuable aid in developing a true love for music. Its rich, full tones thrill and inspire the child with their sweet resonances.

The Brambach is used by the best teachers because it is a beautifully-proportioned instrument of wonderful responsiveness and tonal excellence. And on account of its convenient size it is the ideal piano for the modern home or apartment.

Mail coupon below for further information and for a paper pattern showing the exact space requirements of this beautiful Baby Grand. The pattern will be mailed with our compliments.

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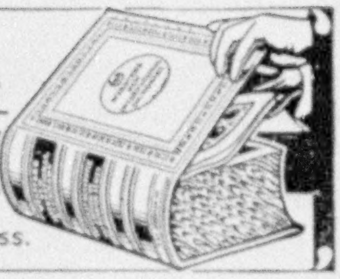
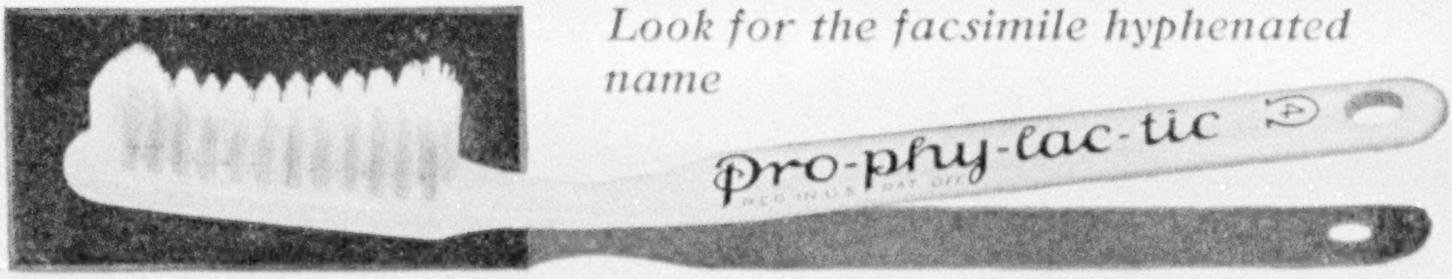
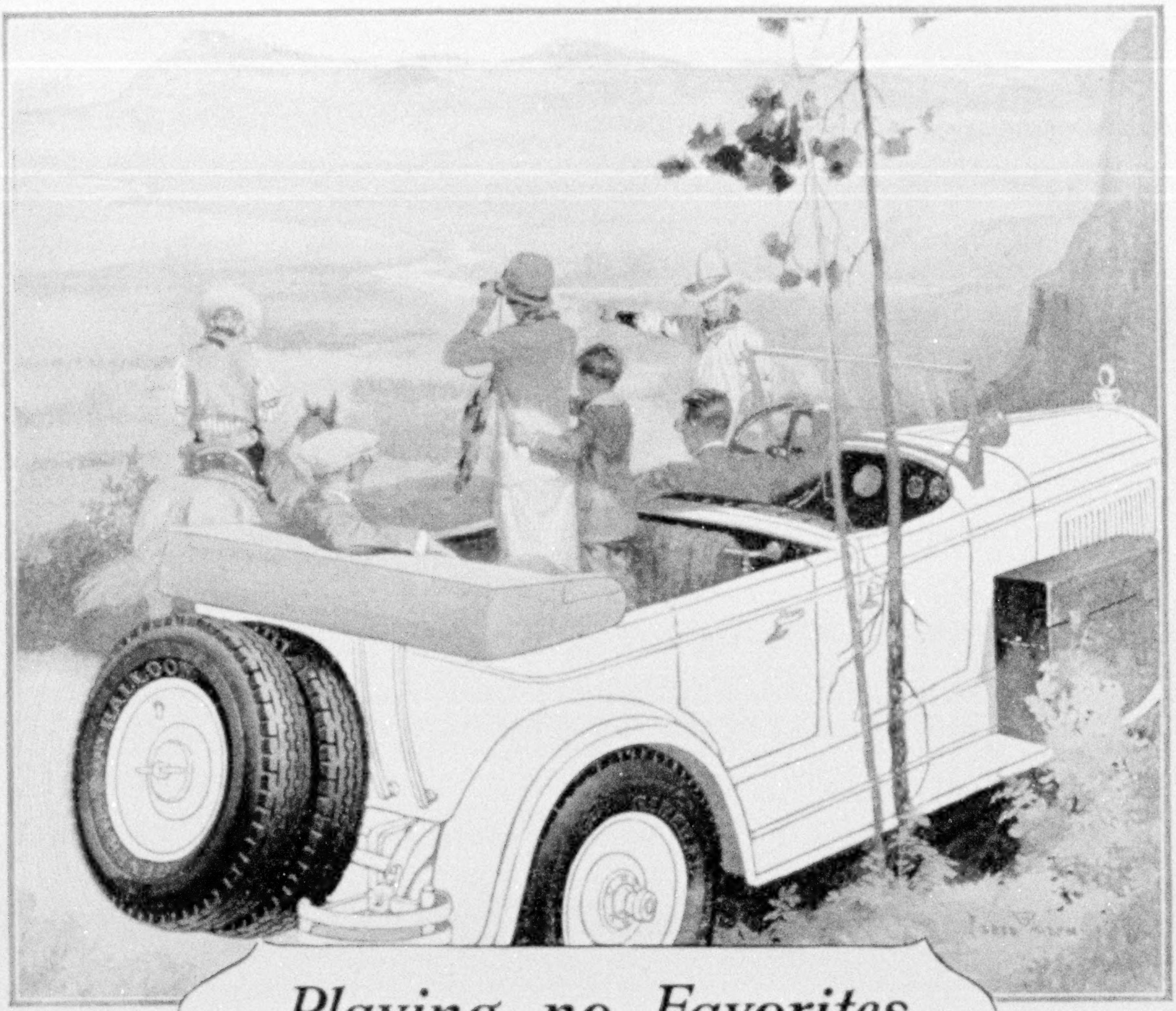




Look for the facsimile hyphenated name



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Big claims won't produce big mileage, but after rolling along on a set of Generals month after month you can look to your speedometer for the real big mileage story.

Users records all over the country prove that General plays no favorites in rolling up big mileage. ᐧ ᐧ ᐧ Easy riding comfort, safety and distinctive good looks all contribute to General's outstanding preference among car owners, but in the final analysis mileage is a tire's strongest good-will builder. Those who are seeking the satisfaction of big mileage and the ultimate economy that goes with it will find that the General dealer has an interesting proposition.

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The Mark of Leading Tire Stores Everywhere

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BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER COMPANY

There is a brand-new Hoover, which alone offers the new double-efficiency principle in modern home-cleaning science:

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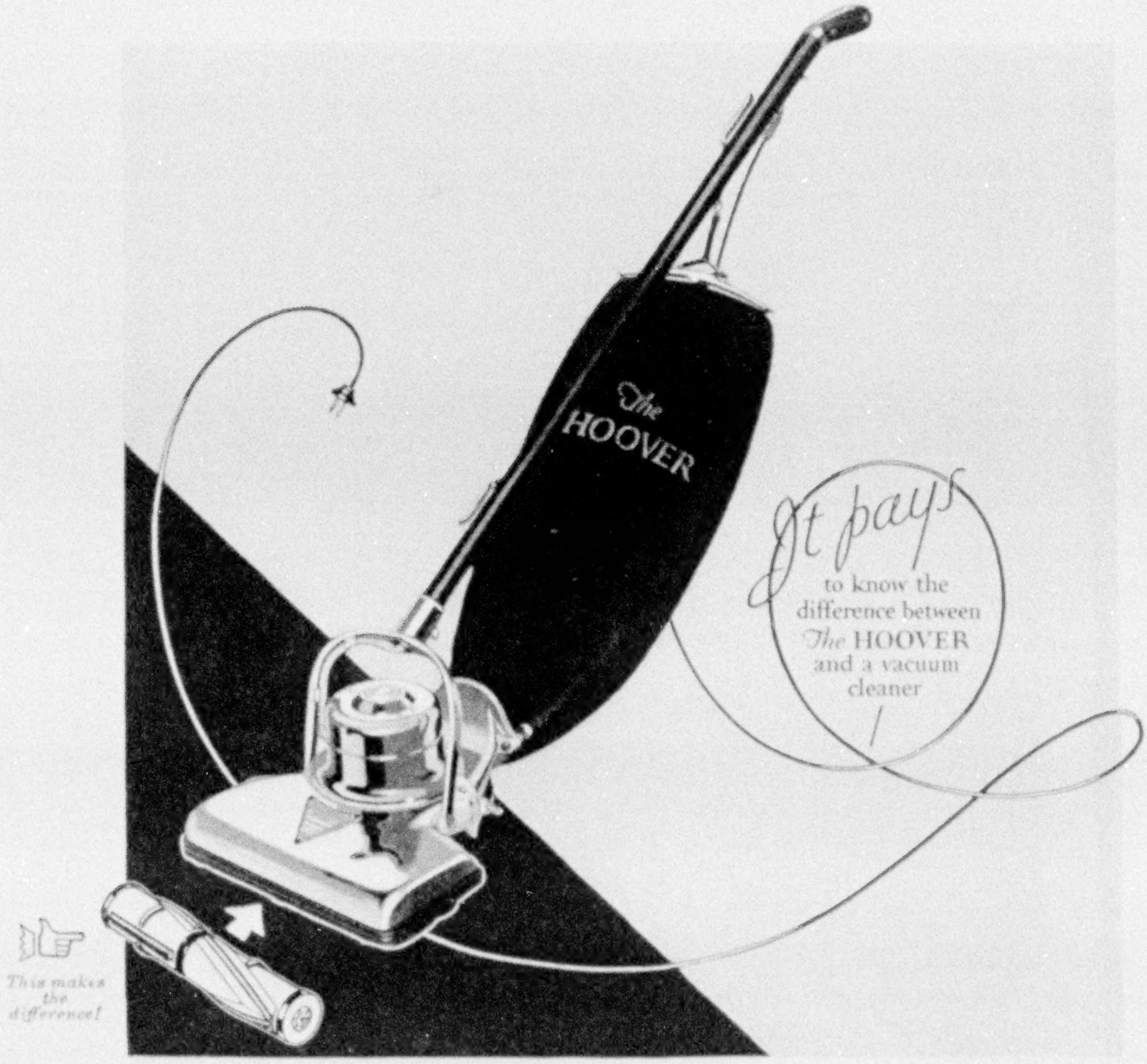
The HOOVER
It pays to know the difference between The HOOVER and a vacuum cleaner!
This makes the difference!

If you want a really *clean* home, you ought to know all about this greater *Hoover!*

The HOOVER

It BEATS ... as it Sweeps as it Cleans

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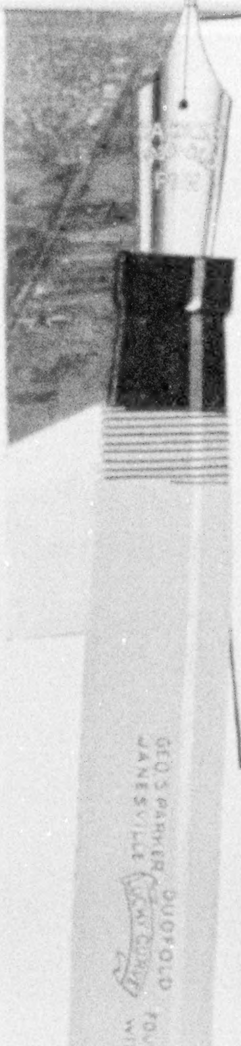
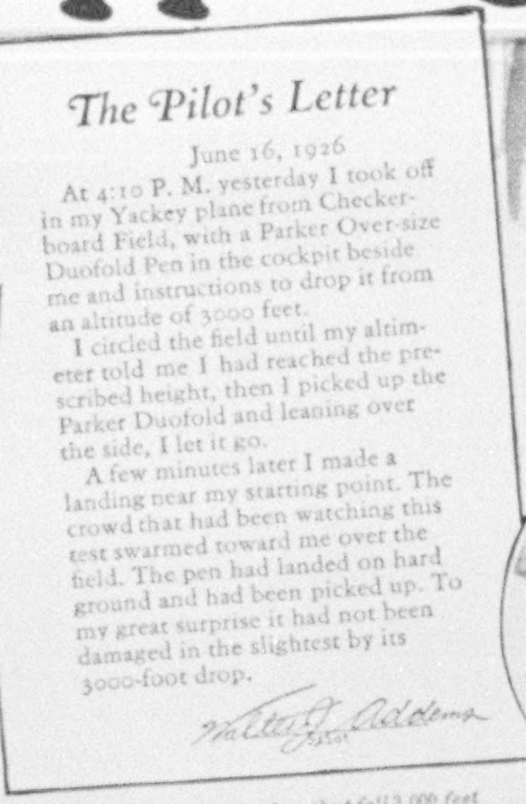
Non-Breakable Barrels Dropped 3000 feet!





The Pilot's Letter

June 16, 1926

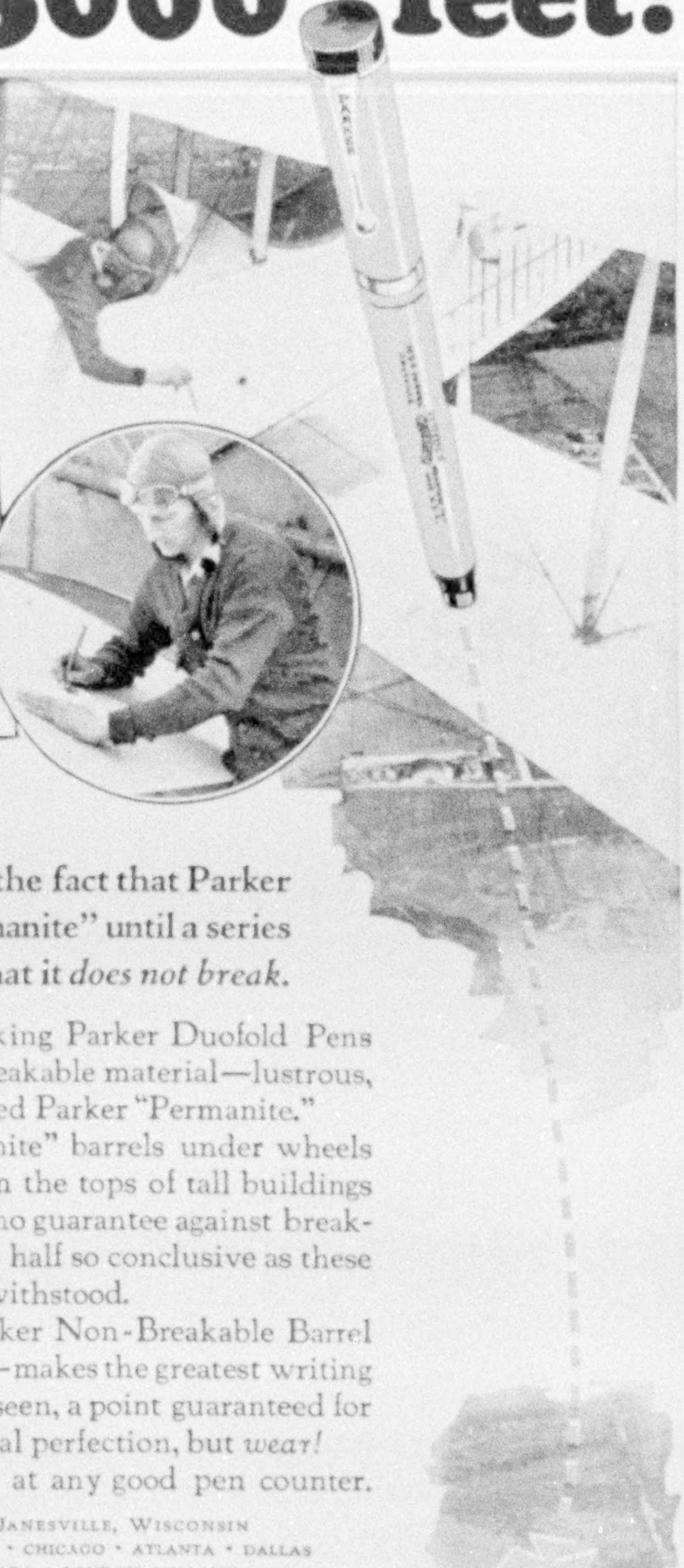
At 4:10 P. M. yesterday I took off in my Yackey plane from Checkerboard Field, with a Parker Over-size Duofold Pen in the cockpit beside me and instructions to drop it from an altitude of 3000 feet.

I circled the field until my altimeter told me I had reached the prescribed height, then I picked up the Parker Duofold and leaning over the side, I let it go.

A few minutes later I made a landing near my starting point. The crowd that had been watching this test swarmed toward me over the field. The pen had landed on hard ground and had been picked up. To my great surprise it had not been damaged in the slightest by its 3000-foot drop.

Walter J. Addems

Signed with the Parker that fell 3,000 feet



For a year we kept secret the fact that Parker Duofold is made of "Permanite" until a series of grueling tests proved that it *does not break*.

FOR a year we've been making Parker Duofold Pens and Pencils of a new non-breakable material—lustrous, beautiful, light in weight—called Parker "Permanite."

We've tested these "Permanite" barrels under wheels of buses, on cement floors, from the tops of tall buildings—even from aeroplanes. And no guarantee against breakage that any maker can offer is half so conclusive as these tests that Parker Duofold has withstood.

This combination—the Parker Non-Breakable Barrel and the Parker Duofold Point—makes the greatest writing instrument the world has ever seen, a point guaranteed for 25 years, not only for mechanical perfection, but *wear!*

Select your Parker Duofold at any good pen counter.

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Parker

Duofold

OVER-SIZE $7

With Lucky Curve Feed and 25 Year Point

Duofold Jr. $5   Lady Duofold $5

Parker Duofold Pencils to match the Pens: Lady Duofold, $3; Over-size Jr., $3.50; "Big Brother" Over-size, $4

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